
FINAL ENVIRONMENTAL IMPACT STATEMENT

APPENDIX SUPPLEMENT

Volume 4

NORTH HAVEN MALL

NORTH HAVEN, CONNECTICUT



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**US Army Corps
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Supplement

to

Appendixes

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NOTE: Only the appendixes augmented by this supplement are listed; those not listed remain as they were published with the draft EIS. Except for Appendix L, which has been revised for the final EIS, all the other appendixes released with the draft EIS are also incorporated here into the final EIS by reference. These appendixes remain valid, but they are extended by this supplemental volume.

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SUPPLEMENT TO APPENDIXES
FOR
FINAL ENVIRONMENTAL IMPACT STATEMENT
NORTH HAVEN MALL
NORTH HAVEN, CONNECTICUT

Introduction

A. Since the issuance of the draft Environmental Impact Statement (DEIS) for the proposed North Haven Mall in February 1982, the proposed project has been modified slightly, certain events have transpired, and additional information has become available. The supplement information in this augments appendixes that accompanied the DEIS, except appendix L, which has been revised to reflect the availability of 1980 census data. In addition, the augmented appendixes incorporate responses to and address certain comments made on the draft EIS that sought clarification of discussions presented in the draft EIS or in the appendixes, particularly those suggesting particular alternatives to the proposed mall.

The principal topics included in this supplement, exclusive of responses to comments, are:

- 1) Preservation of slightly over 2 acres of additional wetlands and uplands because of the withdrawal of the freestanding ("theatre") building and associated parking from the proposed site plan.
- 2) The June 1982 flooding of the Quinnipiac River.
- 3) The specific provisions of an archaeological data recovery plan.
- 4) Malley's termination of its operations in New Haven, and the CBD's potential to comprise a reasonably foreseeable alternative to the mall.
- 5) The status of Macy's commitment to the mall.

1) Withdrawal of the Freestanding Building

The original application for a permit pursuant to section 404 of the Clean Water Act, upon which the draft EIS was based, presented a site plan which included a freestanding building (which had been referred to as a theatre in the draft EIS) and associated parking located in the northeast corner of the property. Comments received on the draft EIS contained several references to the location of this building and its associated parking on wetlands (predominantly wooded swamp) and suggested that a relocation of this structure elsewhere on the site would preserve those wetlands. Because the key design features of the overall mall plan cannot be retained if this structure and its associated parking are moved,

Mall Properties, Inc., the applicant, has withdrawn the building and its 88 associated parking spaces from the application. Figure 1 presents a site plan showing the revised layout of the proposed mall.

The elimination of the freestanding building reduces site coverage by 2.1 acres, from 78 acres to just under 76 acres. Of the additional acreage preserved, 1.3 acres are wetland and the remainder is predominantly upland forest. The modification reduces the gross leasable area (GLA) of the mall by 17,000 square feet.

The withdrawal of the freestanding building from the proposed North Haven Mall affects the analyses presented in the draft EIS because of the reduced impacts on vegetation and wildlife and reduction in GLA and paved surfaces. The implications of the withdrawal are presented in this supplement under the technical subject areas covered in the appendixes to the draft EIS.

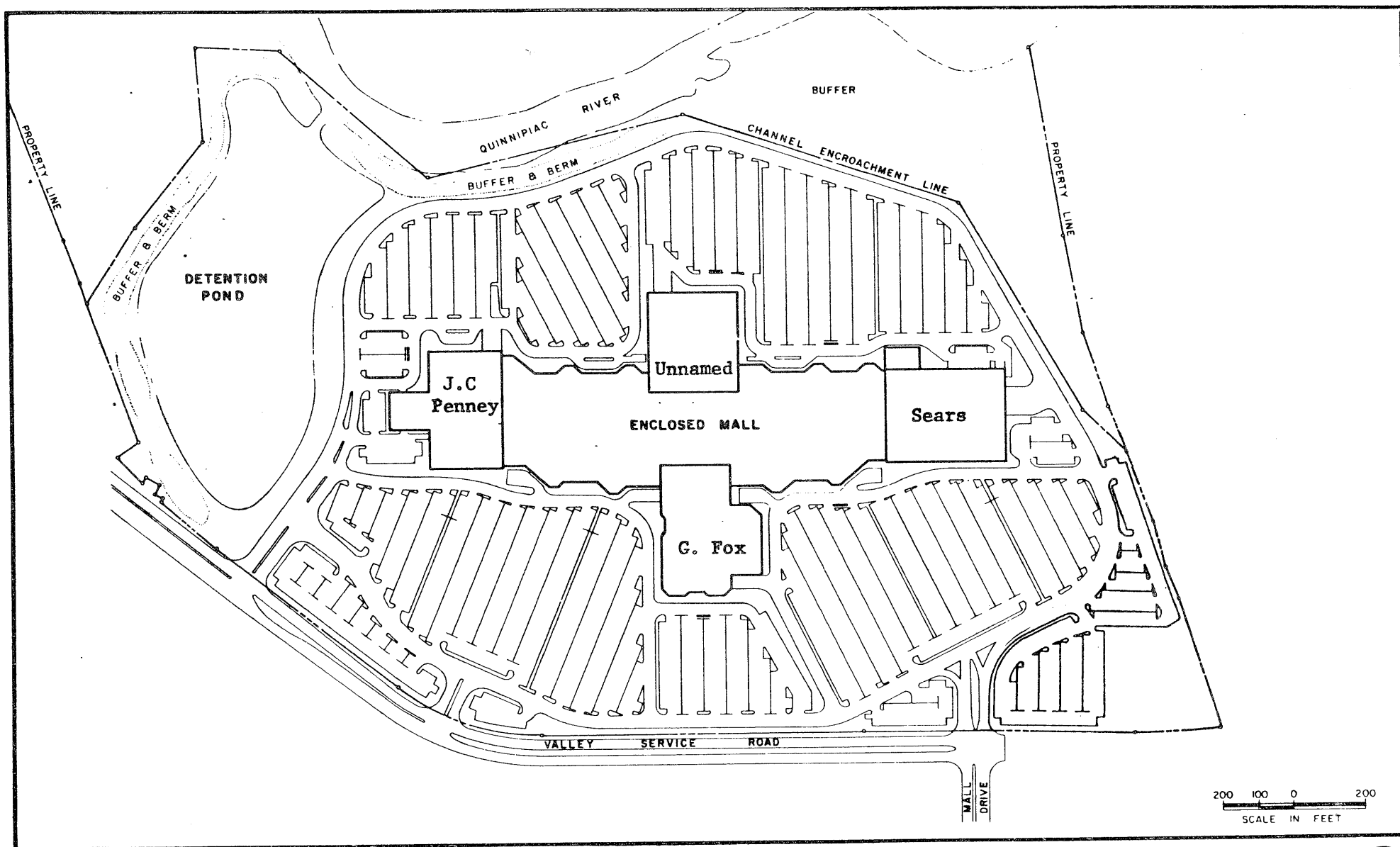
2) The Flood of 1982

In June of 1982, eastern Connecticut experienced serious flooding when over 10 inches of rain fell in the North Haven area. The magnitude of this flood raised questions as to the accuracy of the Federal Emergency Management Agency's (FEMA) Flood Insurance Study, which formed a basis of the Quinnipiac River Flood Study presented as appendix E of the draft EIS. The questions focus on the effects of such extreme flooding on the mall and its facilities, particularly the stormwater detention pond, and on the findings that the mall would have an insignificant impact on Quinnipiac River flooding is affected.

As a result of these concerns, the Corps of Engineers (COE) performed an analysis of the 1982 flood, which included obtaining measurements of high water elevations at the proposed mall site and updating the hydrologic analysis of the river to incorporate recent flow data not used in the FEMA study. The basic conclusions of this analysis are that the 1982 flood was approximately a 200-year event and that the flow in the Quinnipiac River for the 100-year event would probably be higher than indicated in the FEMA study or the draft EIS.

The COE study estimates of the 100-year-flood flow is 7,000 cubic feet per second (cfs) at Wallingford compared to FEMA's estimate of 5,400 cfs. Consequently, the COE estimate of water elevation at the proposed mall site is 16.0 feet compared to 12.8 feet predicted by FEMA and 13.6 feet predicted in the draft EIS. The reasons for these discrepancies are uncertain. Possible reasons include: the addition of river flow data in the hydrology analysis for the 1970's the wettest in a century; development within the basin, increasing the quantity of runoff for a given rainfall; and/or inaccuracies in the FEMA model.

During the preparation of appendix F, an apparent discrepancy between the FEMA estimates of flood elevations and actual flood elevations



North Haven Mall
 Valley Service Road
 North Haven, Connecticut

Figure 1
 Site Plan of Proposed Mall



was investigated based upon the 1979 flood. The discrepancy was found to be at least 1 to 1 1/2 feet for properties along upper State Street. The 1979 flood, with a peak flow at Wallingford of 5,400 cfs, corresponds closely to a flood with a return frequency of about 40 years, according to the COE's revised hydrology, rather than the estimated 100-year flood based on the FEMA hydrology. According to the COE study of the 1982 flood, the 1979 flood should have had a water surface elevation of approximately 14.5 feet compared to the FEMA's figure of 12.8 feet. This confirms the beliefs of local residents that they were experiencing floods greater than those predicted by the FEMA study.

The differences between the FEMA Flood Insurance Study and the COE 1982 flood study affect to some degree the analysis in and conclusions drawn from the Storm Water Management Plan, the Quinnipiac River Flood Study, and the Wallingford Dam Sensitivity Study (appendixes E, F, and G, respectively). An analysis of the implications of the COE's 1982 study for the mall is presented subsequently under the appropriate supplemental appendix heading.

3) Archaeological Data Recovery Plan

Three locales on the proposed mall site and transportation-modification areas are eligible for inclusion in the National Register of Historic Places because of their archaeological significance. The specifics of an archaeological data recovery plan have been developed through consultation among the COE, the Connecticut State Historic Preservation Officer (SHPO), the Advisory Council on Historic Preservation, and Mall Properties, Inc., as these sites are likely to be affected by general construction activity.

The details of this plan and its avoidance or mitigation of impacts to archaeological resources are presented subsequently under the appropriate supplemental appendix heading.

4) The Closure of Malley's and Bullards in the City of New Haven, and the Status of the CBD as an Alternative

Since the publication of the draft EIS, one of the two major department stores in New Haven, Malley's, and Bullard's a large furniture store, have ceased operations. The closing of these stores, in particular Malley's, affects the analysis of alternatives, particularly foreseeability of the CBD expansion as a possible alternative.

In addition, the city has released certain additional limited information concerning its desire to enhance the retail sector of the CBD. The retail development concept selected for consideration includes the refurbishment of the Chapel Square Mall, replacement of Malley's by another department store, and the reduction in size and refurbishment of Macy's and Malley's to create a mall area for small specialty shops and restaurants. The concept is contingent upon a number of occurrences,

including obtaining approximately \$30 million in financing (a substantial portion of which would be public funding). Overall, the concept would reduce the retail square footage historically associated with the Chapel Square Mall area, assuming that a replacement for Malley's could be located.

5) The Status of Macy's

On 10 November 1982, R.H. Macy Properties notified Mall Properties, Inc., that because of the extensive delays in obtaining permits for the proposed mall, uncertainty about the mall's opening date, and the store's need to allocate immediate resources to its ongoing expansion in Florida and Texas, the company was constrained to remove the North Haven Mall from its near term construction program. Macy's expressed its continuing interest in participating in the North Haven Mall if the requisite permits are obtained.

Another department store, Sage-Allen (based in Hartford), has expressed the desire to negotiate with Mall Properties, Inc., to replace Macy's as the fourth anchor at the mall. This is the latest step in Sage-Allen's pursuit of possible participation in the mall over the past several years.

6) Comments of Interest

During the public response period for the draft EIS, numerous comments were received by the COE (see volume 2), and responses to those comments are contained in the final Environmental Impact Statement (FEIS), Volume 3. Several comments, however, were of particular interest because they suggested specific alternatives to the proposed mall or reflected concerns raised by more than a single commenter. As such these considered further in this supplement and they include:

(a) A suggested alternative use of the site for light industrial development, citing potential advantages of less site coverage, less pollution, and greater employment benefits and tax revenues.

(b) A suggested alternative of a more compact three-anchor-mall located on the southeast and central portions of the site and featuring three-story anchors and three decked parking structures.

(c) Several comments concerning the need to perform an analysis of automobile lead emissions.

(d) Several comments concerning public transit service to the proposed mall.

(e) Several comments regarding the impact of trucks delivering fill to the site or merchandise to the mall.

(f) Several comments concerning the impact of the mall on minority employment in New Haven.

B. The following sections present the discussion responding to the additional information and events that have transpired since issuance of the draft EIS. This material is organized by appendix for convenience, with the technical areas presenting the implications of the material described in the previous section.

Appendix A: Geology and Groundwater Resources, Soils, and Topography

The physical features of the proposed mall site are not significantly affected by the additional information available since the release of the draft EIS. The withdrawal of the freestanding building and its associated parking does, however, have some minor effect on the discussions presented in appendix A of the draft EIS.

The revised site plan reflecting the withdrawal of the freestanding building retains the same topographical profile as the original plan with the exception of reduced filling in 2.1 acres of the northeast corner of the site. The mall structure would not move or change in any way; therefore, no changes in the discussion of bedrock are necessary. Surficial deposits in the 2.1 acres are comprised of glacial outwash sand and terrace alluvium of sand and gravel with traces of silt. This material overlays a deep deposit of glacial lake sediments composed of silt and clay. Thus, elimination of the paving and coverage of this area will not affect groundwater to any appreciable degree, and the conclusions presented in appendix A continue to be valid for the revised site plan.

Appendix B: Vegetation, Wildlife, and Wetlands

The withdrawal of the freestanding building and its associated parking affect the information presented in appendix B of the draft EIS, by eliminating the need for fill in 2.1 acres in the northeast corner of the site, 1.3 acres of which are natural wetlands (almost entirely wooded swamp). The remaining area is predominantly upland forest habitat.

The 1.3 acres of wooded swamp preserved by this withdrawal constitutes a wildlife habitat of moderate value. The area has limited value with respect to other primary functions of wetlands, including water purification, storm- and floodwater storage, and groundwater recharge. Consequently, the modification of the permit application reduces slightly the project's impact on wildlife habitat.

Table 13 in the FEIS (table 3 of Appendix B) has been modified, to reflect the changed application and is presented in table 1 of this supplement.

Appendix C: Surface Water Resources and Water Quality

TABLE 1
VEGETATION COMMUNITY TYPES TO BE
ALTERED ON NORTH HAVEN MALL SITE*

<u>Vegetation Community Type</u>	<u>Percentage of Community Altered</u>	<u>Acres</u>
<u>Upland</u>		
Upland Forest	85	16
Successional Shrub	50	1
Old Field	50	3
Disturbed	79	26
Developed	<u>0</u>	<u>0</u>
Subtotal		46
<u>Wetland</u>		
Wooded Swamp	33	7 **
Shrub Swamp	100	16
Marsh	<u>100</u>	<u>1</u>
Subtotal		24 +
<u>Open Water</u>		
Subtotal	60	6
Total		76

* Acreages do not include vegetation community types associated with the transportation modification areas.

** Subsequent to the DEIS, the proposed free-standing building and its associated parking was withdrawn from the North Haven Mall proposal. This reduces the amount of wetlands to be filled by approximately 1.3 acres, and reduced the amount of wooded swamp to be altered from 8 acres to approximately 7 acres.

+ This total includes approximately 7 acres of natural wetlands (primarily wooded swamp) and approximately 17 acres of manmade wetlands.

Source: Final FEIS; Vegetation, Wildlife, and Wetlands; Section IV.A.2

The withdrawal of the freestanding building from the proposed project and permit application affects the conclusions of appendix C in a minor way because of the slight reduction of GLA and the elimination of 2.1 acres of paved area from the site plan. The findings in this appendix had also been questioned in comments on the DEIS in light of the flood of June 1982.

The withdrawal of the freestanding building results in a reduction in GLA of 17,000 square feet of a total of approximately 1.12 million square feet. Several factors including traffic generation, water use, and sewage generation, are derived from GLA. Although the reduction in GLA is a small percentage of the original 1.12 million square feet (1.5 percent), it affects many of the assessments relating to water quality. The reduction in area covered, 2.1 acres from the original 78 acres (2.7 percent), affects runoff volumes and, therefore, water quality considerations.

The prediction of impacts on water quality, presented in appendix C, was based on traffic projections cited in appendix H, Transportation. These were 21,000 vehicles daily with Saturday peaks of 28,000 vehicles. Taking account of the withdrawal of the freestanding building these estimates would be reduced by 1.5 percent, resulting in an average of 20,700 vehicles daily with Saturday peaks of 27,600. The time-averaged axle miles from which pollutant generation was derived would be reduced by slightly more than 1.5 percent because of the greater reduction in parking area. All of the concentration predictions would be reduced by a little more than 1.5 percent. Therefore the finding of the assessment, that the proposed mall would not contribute to a significant increase in overall organic and inorganic compounds in the river does not change.

The other water quality area affected by the reduction in GLA is in sewage generation, presented in appendix K, Utilities, and discussed later. The 1.5 percent reduction in GLA will reduce water use and sewage discharges by a proportional amount, resulting in a reduction of discharge from the North Haven sewage treatment plant. No significant water quality impact was projected in the draft EIS, and this change, while environmentally beneficial, is not significant.

Appendix E: Stormwater Management

Introduction

The conclusions drawn by the COE from its study of the 6 June 1982 Quinnipiac River flooding potentially affect the analysis and conclusions of the stormwater management plan for the proposed North Haven Mall. In addition, the withdrawal of the freestanding building and its associated parking at the northeast corner of the property from the proposal affects the site drainage plan. The implications of these factors on the assessment of storm water management at the proposed mall is presented in the following discussion.

Quinnipiac River Flooding

The COE study of the June 1982 flooding yielded estimates of higher water elevations at the mall site than those derived from the FEMA Flood Insurance Study as modified and presented in the draft EIS. The COE estimated a 100-year flood level at the mall site of 16.0 feet, compared to 13.6 feet presented in the draft EIS. This change in river flooding, however, is not directly related to stormwater which would discharge through the mall's detention pond, primarily because the peak discharge from the mall site would generally precede the peak flow in the river. Generally this occurs in 12 to 15 hours but could happen in 6 hours. Therefore, the water level in the pond would have dropped significantly by the time high elevations in the river occur.

The 100-year flood elevations predicted in the COE study are higher than the overflow spillway of the detention pond (16.0 feet versus 14.0 feet). Thus, when the crest of the flood approaches the lower Quinnipiac River, floodwaters will overtop the spillway. The berm creating the pond, however, is higher than this flood level and, therefore, the floodwaters will not pass through the site but will continue to backwater flood only. The effect of this on the detention pond function would be insignificant. Currents generated by stormwater entering the east side of the pond would be slightly lower because of the greater pond volume and would improve minimally the settling efficiency of the pond. Concurrently, near the outlet, currents might be slightly higher because of eddy effects from the river channel flow. The net effect would be essentially as predicted in appendix E of the draft EIS.

The principal effect of increased water levels in the Quinnipiac River estimated by the COE study, would be more extensive flooding of the two lower level parking lots in the northwest and southeast quadrants of the site.

Previous estimates of flood elevations in the Quinnipiac River indicate that a maximum of 1.6 feet of water would accumulate in the northwest quadrant parking areas under a 100-year flood having a 13.6 foot elevation, which would directly drain to the river. Flooding in the southeast quadrant parking lot is affected by both river flooding and drainage runoff during localized storms. If the river is experiencing a 100-year flood with little stormwater runoff from the local area, then flooding in this lot would be the same as in the northwest lot. However, if local runoff is significant during a storm event, even if there is no river flooding, then flooding in the southeast parking lot would be controlled by water elevations in the detention pond. During a 100-year local storm (rainfall) event the maximum elevation in this lot would reach 14.5 feet. This is higher than the 100-year flood event which was estimated at 13.6 feet. Since the lowest point in the parking lot is at 12 feet, the 100-year local rainfall event would result in a maximum depth of 2.5 feet.

The COE estimate of the 100-year flood event of 16 feet increases the river levels over the previous estimates by 2.4 feet. Because both of the low parking lots are connected to the river the water levels in both lots would reach a maximum elevation equal to that in the river (16 feet). The parking lot elevation of these quadrants ranges from 12 feet to 16 feet msl, which means that there would be a maximum of 4 feet of water at the lowest point in the parking lot.

These two parking lots would not always flood at the same time. If extreme rainfall, such as a thunderstorm, is localized in North Haven or its immediate vicinity, the river may not flood. However, drainage through the detention pond could cause flooding in the southeast parking lot only.

Estimated flooding frequency in these parking lots is also affected by the COE's analysis of the 1982 flood. FEMA projections indicate that the parking lots would begin flooding from the river during a storm with a return frequency of 25 years. A 25-year rainstorm would also begin flooding the southeast parking lot, which is connected to the river through the detention pond. However, the COE estimates of river flooding indicate that the northwestern and southeastern parking lots would begin to store water from a flood with a return interval of 10 rather than 25 years.

Flood Emergency Management Plan

Because the COE estimates more frequent and deeper flooding at the site, Mall Properties, Inc., proposes to institute a Flood Emergency Management Plan rather than raise the site by 2 feet or more. By leaving the site at the proposed grades, the structures and all access roads will remain at or above the 100-year flood elevation estimated by the COE. The flood plain storage volume available on the site is increased because the greater flood elevations estimated by the COE study also means that more acres of the site become available for flood storage.

The Flood Emergency Management Plan consists primarily of monitoring the flood potential of the Quinnipiac River through the U.S. Weather Bureau and the closure and evacuation of the lower parking lots when flood potential is high. Closure of the lower level parking lots would require barricading the onsite circulation roads at five locations. Each barricade would be manned by a guard to prevent entry. Announcements over the mall's public address system would request patrons parked in the lower lots to move their cars to one of the upper lots. The mall operators plan to secure an open-demand contract for towing service. When a flood is probable, tow trucks would be used to relocate vehicles not moved by patrons, to avoid property damage.

There is a lag of over 24 hours from the start of a storm until the Quinnipiac River would crest at the proposed mall site. The Flood Emergency Management Plan would provide at least six hours to evacuate the

parking lots, ample time to complete an evacuation. In fact, because the river would take some time to crest, in more instances closing off the lower level parking lots before the mall opens or after it closes would be possible to avoid the need for evacuation.

Summary

In summary, the revised flood elevations estimated by the COE from the June 1982 flood would not affect the operation of the detention pond because the peak flow of local drainage through the site and detention pond precedes the crest of the river flooding. Extreme flooding of the Quinnipiac River would back up into the detention pond and result in more frequent and deeper water in the two lower parking lots. To prevent damage to property and possible personal injury, the applicant proposes to implement a Flood Emergency Management Plan to monitor potential flooding and close and evacuate the lower parking lots when flooding is probable.

Appendix F: Quinnipiac River Flood Study

Appendix F of the draft EIS presented an analysis of the impact of the proposed mall development on flooding in the Quinnipiac River, based on the application of the Corps of Engineers HEC-1 and HEC-2 hydraulic models. These models route the peak flow of any given flood through the river channel and its flood plain, thereby accounting for the physical dimensions and characteristics of these areas and the loss of valley storage that occurs by encroachment (filling) of the flood plain.

The flood analysis followed the methodology used by FEMA in performing Flood Insurance Studies -- it employed the same model that FEMA used for the North Haven Flood Insurance Study. The methodology was modified, and the results made more conservative, by accounting for the increase in peak flows that occurs when valley storage is lost through filling of the flood plain.

To examine the impact of the proposed mall development alone and the cumulative impact of other potential projects that may affect flooding, the model was designed to include: (1) the geometry of the river with the mall site filled as proposed, (2) the mall site and all potentially developable river-front properties in the town of North Haven filled; and finally, (3) the filling of the entire length of the river in the town of North Haven to the FEMA-determined floodway boundaries. These flood simulations were used to predict elevations at several locations along the river, including the mall site, for floods of 2-, 10-, 50- and 100-year return frequencies. Lesser floods of 6 month and 1 year return frequencies were also investigated and found to be confined to the existing banks of the river.

Prior Investigations

During the preparation of appendix F, information was received suggesting that the elevations along the Quinnipiac River are much greater than those presented in the then Draft Flood Insurance Study. To examine this issue, a field survey was performed along upper State Street by interviewing residents in this area and photographing high water marks from the flood of 1979. The peak flow data during this flood corresponded closely to the FEMA flow for the 100-year flood. The actual flood levels were some 1 to 1 1/2 feet higher than the predicted levels.

The findings of the Quinnipiac River Flood Study relative to the mall's effect on flooding, however, were determined to be valid because loss of storage several magnitudes greater than that projected at the proposed mall site had no measurable effect on flooding. Furthermore, the mall site is not in the conveyance way even at the higher flood elevations estimated by the COE.

Implications of June 1982 Flood

In June 1982, an extreme flood occurred in the Quinnipiac River. During this flood most of the mall site was flooded. There were also indications that a portion of Valley Service Road was flooded; the precise depth and extent of this flooding is unknown. Based on published topographical information, the flooding was limited. The source of flooding on Valley Service Road is also unknown; the flood could have been caused by overflow from the twin culverts which pass under I-91 and drain the remainder of the basin (approximately 830 acres) or from the river.

The COE investigated this flood, taking measurements of high water marks at the mall site after the flood and performing a hydrologic analysis. The COE report released in September 1982 concluded that the flood was a 200-year event, that flows in the Quinnipiac River at Wallingford during a 100 year event would be 7,000 cfs, rather than the 5,400 used by FEMA in the Flood Insurance Study, and that the 100 year flood elevation at the mall site would be 16.0 rather than the 12.8 predicted by FEMA in the Flood Insurance Study.

The results of this COE study were presented to FEMA for comment. FEMA determined that the results were different from its own study and that a revision to its study might be warranted. This revision would probably include modification of the hydrology to develop a new 100-year flood flow and resimulation of water surface profiles.

The findings presented in appendix F of the draft EIS have been reviewed in light of the COE study. It is recognized that water at the mall site will be higher and somewhat more extensive than previously reported. Mall Properties, Inc., however, does not propose modifying the site plan by the addition of more fill, because structures and access

roads would be at or above the 100-year (COE) flood event elevation. In addition, the effects of the mall on flooding in the Quinnipiac River would not be significantly changed.

The reasons for these conclusions are twofold. First, the berm separating the mall site from the river channel (conveyance way for flood waters) is significantly higher than the 16.0 feet estimated for the 100-year flood. Thus, the site continues to be a backwater area during floods and not a conveyance way that would be blocked by filling. The capacity of the conveyance way of the Quinnipiac River would remain the same with or without the mall.

The second reason is that the loss of storage at the site, considering the higher estimated flood levels, would be small relative to the total available valley storage in the Quinnipiac River, which is increased significantly. Thus the relative importance of storage loss, found to be negligible in the draft EIS, would be even less with the higher estimated flood levels.

The loss of storage of floodwaters presented in the draft EIS for the 100-year flood was 214-acre-feet. The higher elevation estimated by the COE study resulted in an increase in storage loss to 291 acre-feet. The total valley storage, on the other hand, was increased by a greater percentage because the flood plain would be wider, as well as deeper, at the higher water levels while the mall site area is fixed with only depth changing.

Although a portion of the Valley Service Road incurred limited flooding during the June 1982 flood, the road, after planned modifications, would be at least 2 feet above the 100-year flood elevation derived from the COE study. The modifications planned for Valley Service Road also include new culverts designed to pass the 100-year storm event from the upstream drainage basin without overflowing. Thus, the drainage system planned for the proposed mall would prevent flooding of this road by overflows from the I-91 twin culverts.

The site would flood more frequently and floodwater in the lower parking area in the northwest and southeast quadrants would be deeper with these higher estimates. The mall buildings, however, would not flood. The implications of the increased flooding were discussed earlier under stormwater management, and included an estimate of parking lot flooding frequency and the proposed Flood Emergency Management Plan.

Withdrawal of Freestanding Building

An additional factor that affects flooding, although not significantly, is the withdrawal of the freestanding building and its associated parking. This 2.1 acre area diminishes the area to be filled by approximately 3 percent, reducing slightly the loss of storage.

Because the loss of storage had previously been found to have no significant impact on river flooding, this reduction in fill will not significantly affect flooding either.

The withdrawal of the freestanding building also causes a 2.7 percent reduction in paved area of the mall, resulting in lower peak flows entering the Quinnipiac River. Again, this will not be a significant change, as the mall causes no measurable change in flooding in the river alone or cumulatively with potential development in the town of North Haven.

Appendix G: Wallingford Dam Study

The estimate of the 100-year flood level of 16 feet resulting from the COE study of the June 1982 flood results in an increase in both existing mall site flood storage and that which would remain after mall development. Using the previous estimates of 13.6 feet for the 100-year flood, described in the preceding section, development of the mall would result in a loss of 214.0 acre-feet of storage. Assuming the higher COE river flood elevations, these storage volumes increase to 484 acre-feet and 193 acre-feet, before and after development, respectively, resulting in a total storage loss of 291 acre-feet.

The Wallingford Dam Study was prepared to determine the sensitivity of the Lower Quinnipiac River to storage reductions, by examining the effects of the loss of available storage in Community Lake when the Wallingford Dam failed during the flood of 1979. Using actual flow measurements of this flood, as recorded by the USGS gage located below the dam, it was determined that a total of 629 acre-feet of storage was lost from the river and that this loss would not result in any measurable change in peak flows.

The estimated loss of 291 acre-feet is 46 percent of the 629 acre-feet lost when the Wallingford Dam collapsed. Because the loss of this larger storage was shown not to result in any change in river flows (and consequently water surface elevations), the finding of this study, that storage loss at the mall site would not affect flooding in the Lower Quinnipiac River, is still valid.

In addition, the higher elevations predicted by the COE study would affect the storage in the entire river. Because the mall site is a fixed area whereas the flood plain of the river would be wider with higher water levels, the loss at the mall site, although increased, would be a lower percentage of total valley storage. This results in a slightly lower impact potential from storage loss than at the lower water levels previously predicted. Because the Lower Quinnipiac River is insensitive to storage losses of this magnitude, however, in the finding of no significant impact remains.

Appendix H: Transportation

Introduction

This section augments the discussion of the impacts of trucking, both for general delivery and construction purposes, on the town of North Haven. It also amplifies and updates the discussion of public transportation facilities and usage patterns in the vicinity of the North Haven Mall site, future improvements in the public transportation system, and the impacts of the proposed mall on public transportation.

Trucking Impacts - Deliveries

The amount of truck traffic to and from the mall was estimated primarily on the basis of results of a week-long survey at three department stores in an existing regional shopping center in New York State. Some older published information on this subject was also referred to. Department stores and restaurants are virtually the only major generators of truck traffic in regional shopping centers.

Between 60 and 75 large trucks (excluding vans or other small delivery and service vehicles) would probably visit North Haven Mall each day, most of which would be traveling via I-91 and Route 5. Nearly all the truck traffic would occur between 8:00 a.m. and 3:00 p.m. Less than 5 percent of the total number of trucks were observed before or after these hours at the New York State center. No nighttime truck activity is expected to occur.

Construction Impacts

The offsite fill requirement for the mall site and associated transportation modifications totals approximately 380,000 cubic yards. This fill would be placed, for the most part, concurrently with the hydraulically placed fill from the onsite sources. The number of truck trips generated by offsite fill has been calculated for peak and average periods. Considering the legal weight limits for trucks, an average of approximately 15 cubic yards per truck load will be transported. This results in a total number of truck loads of 25,333 over a 1-year period or, over the 250 working days, an average of 100 trucks per day. Because each truck would make two trips (arriving and departing), an average of 25 trips per hour would result.

Recognizing that the staging of filling will result in a less than uniform daily delivery, the maximum quantity of fill that can be placed and properly compacted in a single day is estimated at 3,000 cubic yards. This would result in a maximum of 200 truck loads in a day or 50 trips per hour.

To assess the impact of these truck trips on traffic in North Haven, a passenger car equivalent (PCE) of three for each truck is used.

This is higher than normal because of the varied types of trucks and loads. The standard practice is to use a PCE of two. Comparing the resulting average daily traffic increase of 150 PCE per hour to the mall-generated traffic of 56,000 trips per day (peak day) and 5,170 trips per hour (peak hour) indicates that the impacts from truck traffic would not be significant.

Although the source of the fill is not known, the routing of truck traffic will be controlled by the town, allowing distribution on different routes to minimize impacts. To put the possible impact into perspective, if all of this truck traffic were to be routed down Washington Avenue, the current average daily traffic of 12,600 would increase to 13,200, a 4.7 percent increase. Level of service would remain unchanged at level C.

Public Transportation

Present Service

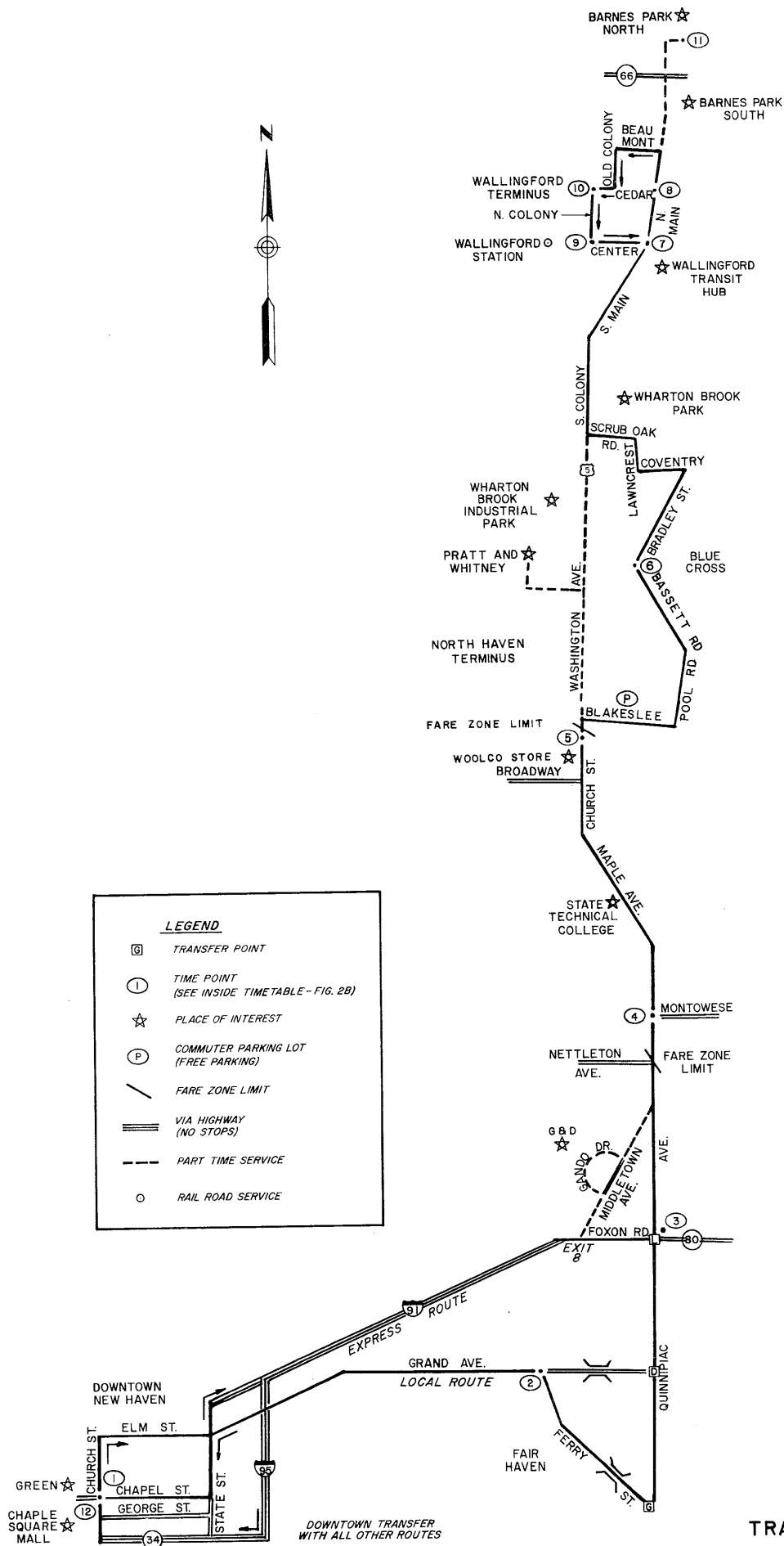
Public transportation in North Haven is currently some what limited; only one bus route is considered to be of direct benefit to the North Haven Mall site. Service on that route has been improved since the preparation of appendix H.

Figure 2 gives the routing and schedule of Connecticut Transit Bus Route C, which links downtown New Haven with Wallingford, via North Haven. On weekdays there are 20 northbound and 19 southbound trips daily. Four early morning northbound trips follow the Washington Avenue route, while 16 take the more indirect route via Blakeslee Avenue, Pool Road, Bassett Road, and Bradley Street. In the southbound direction seven trips, between about 3:30 and 7:00 p.m., follow Washington Avenue, while 12 take the longer route.

There is hourly bus service in each direction until 2:00 p.m. and half-hour service until about 7:00 p.m. On Saturdays, there are nine hourly trips each way, all via the longer route.

Walking distance from the proposed mall site (west side of Valley Service Road) to the nearest point on Washington Avenue is 1,200 feet (less than 1/4 mile); to the Washington-Blakeslee intersection, about 3,600 feet (2/3 mile).

At present, a single fare within one fare zone is 60 cents; extending through two zones the fare is 90 cents. The fare zone limit from New Haven is located on Washington Avenue at the North Haven Shopping Center. Therefore, riders from New Haven traveling to the closest stop for the mall would spend a 90 cent fare. Reduced fares are available to students, elderly and disabled persons, and monthly pass holders.



TRANSIT BUS ROUTE C

C—WALLINGFORD C—NORTH HAVEN

OUTBOUND TO WALLINGFORD										
⑪ DOWNTOWN NEW HAVEN Church & George	① NEW HAVEN GREEN Church at Chapel	② Grand Avenue & Ferry Street	③ Quinnipiac Avenue & Route 80	④ Quinnipiac Avenue & Montrose Avenue	⑤ NORTH HAVEN TERMINUS Woolco Shopping Ctr.	⑥ BLUE CROSS Bassett & Bradley	⑦ Main Street & Center Street	⑧ Main Street & Cedar Lane	⑩ Route 5 and Cedar Lane	⑪ BARNES PARK N. TERMINUS
LV	LV	LV	LV	LV	LV	LV	AR	AR	AR	AR
WEEKDAYS										
—	6:00	1-91	6:09	6:15	6:22	Rte 5	6:33	6:37	—	6:48
—	6:25	1-91	6:34	6:41	6:50	—	—	—	—	—
—	PW6:30	1-91	1-91	1-91	1-91	PW	7:00	7:03	—	7:15
—	PW6:55	1-91	7:04	7:11	7:21	PW	7:34	7:37	—	7:50
7:22	7:30	1-91	7:39	7:46	7:56	8:03	8:13	8:16	—	8:22
7:46	7:50	1-91	8:08	8:15	8:25	8:30	8:40	8:43	8:44	—
8:16	8:20	8:30	8:38	8:45	8:55	9:00	9:10	9:13	9:14	—
9:16	9:20	9:30	9:38	9:45	9:55	10:00	10:10	10:13	10:14	—
—	10:20	10:30	10:38	10:45	10:55	11:00	11:10	11:13	11:14	—
—	11:20	11:30	11:38	11:45	11:55	12:00	12:10	12:13	12:14	—
—	12:20	12:30	12:38	12:45	12:55	1:00	1:10	1:13	1:14	—
—	1:25	1:35	1:43	1:50	2:00	2:05	2:15	2:18	2:20	—
—	1:45	1-91	1:54	2:01	2:11	—	—	—	—	—
—	2:00	2:10	2:19	2:26	2:36	2:41	2:52	2:55	—	3:00
—	2:30	2:40	2:49	2:56	3:06	3:11	3:22	3:25	—	3:30
—	3:00	3:10	3:18	3:25	—	—	—	—	—	—
3:01	3:05	1-91	3:14	3:21	3:31	3:36	3:47	3:50	—	3:55
3:36	3:40	1-91	3:49	3:56	4:06	4:11	4:22	4:25	—	4:30
4:10	4:15	1-91	4:24	4:31	4:41	4:46	4:57	5:00	5:03	—
4:35	4:40	1-91	4:49	4:56	5:06	5:11	5:22	5:26	5:27	—
5:05	5:10	1-91	5:19	5:26	5:36	5:41	5:52	5:56	5:57	—
5:27	5:30	5:40	5:48	5:56	6:06	6:11	6:22	6:26	6:27	—
6:07	6:10	1-91	6:19	6:26	6:36	6:41	6:51	6:53	6:55	—
SATURDAYS										
—	6:50	1-91	6:59	7:06	7:16	—	—	—	—	—
7:46	7:50	1-91	7:59	8:06	8:16	—	—	—	—	—
—	8:20	8:30	8:38	8:45	8:55	9:00	9:10	9:13	9:14	—
9:16	9:20	9:30	9:38	9:45	9:55	10:00	10:10	10:13	10:14	—
—	10:20	10:30	10:38	10:45	10:55	11:00	11:10	11:13	11:14	—
—	11:20	11:30	11:38	11:45	11:55	12:00	12:10	12:13	12:14	—
—	12:20	12:30	12:38	12:45	12:55	1:00	1:10	1:13	1:14	—
—	1:20	1:30	1:38	1:45	1:55	2:00	2:10	2:13	2:14	—
—	2:20	2:30	2:38	2:45	2:55	3:00	3:10	3:13	3:14	—
—	3:20	3:30	3:38	3:45	3:55	4:00	4:10	4:13	4:14	—
—	4:20	4:30	4:38	4:45	4:55	5:00	5:10	5:13	5:14	—
5:09	5:10	5:20	5:28	5:35	5:45	—	—	—	—	—
6:09	6:10	6:20	6:28	6:35	6:45	—	—	—	—	—

INBOUND TO NEW HAVEN GREEN

⑪ BARNES PARK N. TERMINUS	⑧ Main Street & Cedar Lane	⑩ Route 5 and Cedar Lane	⑨ Route 5 and Center Street	⑦ Main Street & Center Street	⑥ BLUE CROSS Bassett & Bradley	⑤ NORTH HAVEN TERMINUS Woolco Shopping Ctr.	④ Quinnipiac Avenue & Montrose Avenue	③ Quinnipiac Avenue & Route 80	② Grand Avenue & Ferry Street	① NEW HAVEN GREEN Church at Chapel
LV	LV	LV	LV	LV	LV	LV	LV	LV	LV	AR
WEEKDAYS										
—	—	—	—	—	—	5:50	6:00	6:07	6:15	6:25
6:53	6:55	—	—	6:36	6:51	6:57	7:07	7:14	1-91	7:25
—	7:00	—	—	7:03	7:15	7:22	7:32	7:39	1-91	7:50
7:23	7:30	—	—	7:33	7:46	7:52	8:02	8:09	1-91	8:20
7:53	8:00	—	—	8:03	8:16	8:22	8:32	8:39	1-91	8:50
8:26	8:30	—	—	8:33	8:46	8:52	9:02	9:09	1-91	9:20
—	8:43	8:53	8:57	9:00	9:10	9:15	9:25	9:32	9:40	9:50
—	9:13	9:23	9:27	9:30	9:40	9:45	9:55	10:02	10:10	10:20
—	10:13	10:23	10:27	10:30	10:40	10:45	10:55	11:02	11:10	11:20
—	11:13	11:23	11:27	11:30	11:40	11:45	11:55	12:02	12:10	12:20
—	12:13	12:25	12:29	12:32	12:43	12:50	1:00	1:07	1:15	1:25
—	1:13	1:25	1:29	1:32	1:43	1:50	2:00	2:07	2:15	2:25
—	—	—	—	—	—	2:20	2:30	2:37	2:45	2:55
—	2:19	2:25	2:29	2:32	2:43	2:50	3:00	3:07	3:15	3:25
—	—	—	—	—	—	—	3:30	—	1-91	3:47
PW3:07	3:16	—	—	3:20	—	3:45	3:55	4:02	1-91	4:10
3:37	3:46	—	—	3:50	—	4:02	4:12	4:19	1-91	4:30
4:05	4:13	—	—	4:16	4:25	4:32	4:42	—	1-91	5:00
PW4:35	4:43	—	—	4:46	—	5:02	5:12	5:19	1-91	5:30
—	5:00	5:03	5:07	5:10	5:20	5:25	5:35	5:42	5:50	6:00
—	5:26	5:27	5:30	Rte. 5	Rte. 5	1-91	1-91	1-91	1-91	6:10
—	5:56	6:00	6:03	6:05	Rte. 5	6:14	6:22	6:29	1-91	6:40
—	6:53	6:55	6:58	7:00	Rte. 5	7:09	7:17	7:24	1-91	7:35
SATURDAYS										
—	—	—	—	—	—	7:22	7:32	7:39	1-91	7:50
—	—	—	—	—	—	8:22	8:32	8:39	1-91	8:50
—	—	—	—	—	—	8:52	9:02	9:09	1-91	9:20
—	9:13	9:23	9:27	9:30	9:40	9:45	9:55	10:02	10:10	10:20
—	10:13	10:23	10:27	10:30	10:40	10:45	10:55	11:02	11:10	11:20
—	11:13	11:23	11:27	11:30	11:40	11:45	11:55	12:02	12:10	12:20
—	12:13	12:23	12:27	12:30	12:40	12:45	12:55	1:02	1:10	1:20
—	1:13	1:23	1:27	1:30	1:40	1:45	1:55	2:02	2:10	2:20
—	2:13	2:23	2:27	2:30	2:40	2:45	2:55	3:02	3:10	3:20
—	3:13	3:23	3:27	3:30	3:40	3:45	3:55	4:02	4:10	4:20
—	4:13	4:23	4:27	4:30	4:40	4:45	4:55	5:02	1-91	5:10
—	5:13	5:23	5:27	5:30	5:40	5:45	5:55	6:02	1-91	6:10
—	—	—	—	—	—	6:45	6:55	7:02	7:10	7:20

- * MIDDLETOWN AVE.: Bus operates via Middletown Avenue and Gando Drive
- * BLUE CROSS: Bus serves Blue Cross via Route 5
- PW Bus operates into Pratt and Whitney facility.
- S Bus serves Barnes Park South only.
- † To or from Hemingway and Quinnipiac

NOTE: Time shown in LIGHT FACE indicates A.M.
Time shown in BOLD FACE indicates P.M.
All times are APPROXIMATE

FIGURE 2B

Recent Service Improvements

A combination of increasing costs and generally static subsidy levels has restricted the extent of new transit commitments in the Greater New Haven area. However, limited increases in service attributable to route restructuring were implemented in 1981 and early 1982, including improvements to Route C. Thus, Connecticut Transit has now shifted the Route C service, formerly on Pool Road (north of Clintonville Road), to Washington Avenue. As noted, most trips turn east on Blakeslee Avenue, but some continue north on Washington Avenue. The revised bus service has been helpful in stimulating some "reverse commuting", -- encouraging bus ridership outward from New Haven to North Haven and Wallingford. The restructured bus service could also help stimulate an increase in local intratown transit use within North Haven.

Impact of the Proposed Mall on Public Transportation

New or further revised bus routes between the mall and surrounding communities could be established, with the mall itself becoming a bus terminal and/or transfer point for the various new or rerouted bus lines because the mall would be a major activity and employment center and thus a significant generator of new transit trips. The North Haven Mall site plan has been designed to accommodate such future use (appendix H, page 42).

Connecticut Transit has expressed a willingness to cooperate with major employers in helping provide bus service to attract workers from inner city areas. In several cases, for example, Pratt & Whitney and Blue Cross-Blue Shield in North Haven, this has been possible because the schedule permitted route deviations without added cost and because the reverse commuting, in these instances, generated added revenue. Similar arrangements would seem possible for North Haven Mall if it becomes operational.

The fiscal integrity of the existing public transit service in the Greater New Haven area probably will not be adversely affected by the proposed mall. The 1977 Greater New Haven Transit Study states that 15 percent of the shopping trips to one of the two major downtown department stores arrived by public transit. It can be assumed that this approximate figure can also be assumed to apply to shopping trips to downtown New Haven generally. However, most of these shoppers were not public transit riders by choice, but used buses because they were the only, or certainly the most logical, way to travel downtown. Thus, these riders are not likely to shift to autos and drive to the North Haven Mall. Therefore, the impact on downtown transit service is not expected to be significant.

Withdrawal of Freestanding Building

The withdrawal of the freestanding building and associated parking will cause a slight reduction in vehicular traffic of 1.5 percent (see p. 11, supra). This will minimally reduce the traffic impact upon the town of North Haven.

Appendix I: Air Quality

Analysis of Lead Levels

A detailed analysis of lead levels was not conducted for the draft EIS because EPA and other agencies have consistently predicted that ambient lead concentrations would decrease with the increasing use of unleaded gasoline, and that lead levels would be below NAAQS regardless of the development of the North Haven Mall. A number of commenters questioned the correctness of these predictions; therefore, an analysis of lead was performed using the EPA-developed methodology (Supplementary Guidelines for Lead Implementation Plans Revised Section 4.3 "Projecting Automotive Lead Emissions," EPA-450/2-78-038a, July 1979). The results of this analysis are shown below in table 2:

Lead Pollutant Burdens For North Haven Mall Market Area

<u>Case</u>	<u>Pollutant Burdens</u>
1980 base	127 g/day
1984 without mall	110 g/day
1984 with mall	110 g/day

Lead pollutant burdens are projected to be approximately 15 percent lower in 1984 than 1980. In addition, while increased traffic volumes on feeder streets to the mall would result in increased lead concentrations on such streets, the above analysis shows that on an areawide basis, pollutant burdens of lead with the mall are essentially the same as pollutant burdens without the mall. This is expected, because area-wide vehicle miles traveled with and without the mall, are projected to be approximately equal.

A recent study of levels adjacent to highways conducted by the Federal Highway Administration (FHA) (Chaves, J. R., and Hatzi, P., A Highway Microscale Lead Analysis, FHWA, 1981) concludes the following:

- (1) From 1975 to 1982, 400 percent decrease in vehicular lead emission factors is expected; by 1990, a 730 percent reduction is expected. These estimates are based on the anticipated effect of present Federal regulations.

(2) Results of a 2-year continuous monitoring program along a highway in New Jersey show that by 1990 lead levels are expected to be below NAAQS at receptor locations.

(3) Existing line-source models are not suitable for estimating lead concentrations along roadways. The expenditure of resources to verify existing models through field monitoring is not justified because motor vehicle emissions are rapidly decreasing with time.

(4) Based on its investigation and available lead data along highways, the FHA concluded that there is no need or justification for requiring microscale lead analyses in future highway environmental impact statements and environmental assessments.

In addition, the Technical Support Branch of EPA Region I confirmed that (a) EPA expects vehicular lead emissions to decrease in the future, (b) at present, there is no acceptable model for analyzing lead on a microscale basis, and (c) in general, EPA does not require a microscale analysis of lead for projects such as the proposed mall.

As indicated, there is no reliable method for predicting the increase in the magnitude of lead concentration at specific sites. Nevertheless, EPA, the FHWA studies, and the additional studies undertaken here confirm the conclusions regarding lead stated in the draft EIS: that vehicular lead emissions are expected to decrease in the future, that lead concentrations are expected to be below the NAAQS in the future because of decreased vehicular lead emissions, and that the proposed project does not require a detailed microscale analysis of lead.

Withdrawal of Freestanding Building

The withdrawal of the freestanding building and associated parking would cause the slight reduction in vehicular traffic previously identified, and thus a slight, but insignificant decrease of air quality impacts.

Appendix J: Noise

The withdrawal of the freestanding building and associated parking would cause a slight, but insignificant, reduction in vehicular traffic and thus a slight reduction in noise impacts.

Appendix K: Utilities

The withdrawal of the freestanding building reduces the GLA by 17,000 square feet or 1.5 percent. The GLA is the basis for estimating of the demand for utility services, including water supply, sewage, solid waste, electricity, and telephone. The reduction in demand would be proportional to the reduction in GLA.

Appendix K concluded that the demand for utility services would not result in any significant adverse impact on either the ability of each utility to provide adequate service to its customers or the environment. A 1.5-percent reduction in demand would reduce slightly the impact described in this appendix.

Appendix M: Community and Visual Quality

Employment Impacts on Inner-City Residents and Minorities

The proposed mall would generate a significant number of permanent and short-term employment opportunities for residents of the New Haven-West Haven SMSA, with additional jobs because of secondary multiplier effects. The new permanent positions associated with the mall (exclusive of secondary employment) would be somewhat offset by losses elsewhere in the metropolitan area for a net increase of 1,150 positions. This assumes a diversion of shoppers' goods sales, data reviewed in appendix L revised, and that diminished sales at other retail stores are converted into lost jobs.

With the exception of New Haven, the majority of lost jobs in the SMSA are located in areas lacking good quality transit service. Therefore, a major portion of these positions can be assumed to be held by workers who travel to work via auto.* These same workers could easily reach the centrally located mall, again via auto, and their experience could place them in demand by the mall's employers. Therefore, these workers are not expected to incur any significant unemployment or related problems as a result of mall opening.

The mall would have little unemployment impact on inner-city residents. Since the publication of the draft EIS, Connecticut Transit has markedly improved the Route C Bus Line, which brings fairly frequent bus service within two-thirds (2/3) of a mile of the mall and some service within a quarter (1/4) of a mile (see earlier discussion of appendix H). While use of this service would pose some added cost (\$0.90 at the most,

* This assumption is reinforced by the "Greater New Haven Transit Study," Wilbur Smith and Associates, 1977, which found that only about 7 percent of Hamden's workers need public transit service.

each way) and added time (1/2 hour each way) to the work trip of inner-city residents, the job opportunities provided by the mall would be accessible to them.

However, if the transit service to the mall is ignored for the purpose of analysis, the number of inner-city residents who would become unemployed upon mall opening is necessary to consider. Information appearing in the final EIS, revised appendix L, indicates that the New Haven CBD and the remainder of the city would stand to lose a total of 160 jobs assuming zero income growth.

According to a survey conducted by Wilbur Smith & Associates (Greater New Haven Transit Study, 1977), 43 percent of all workers who use public transit to reach downtown job locations did not have a personal car available. This same study indicated that 49 percent of Malley's employees commuted to work via bus. Extending this 49 percent figure to all retail sales workers indicates that 21 percent (49 percent of 43 percent) of downtown retail sales workers depend on public transportation.

Therefore, of the 160 jobs that would be lost in New Haven, an estimated 34 ($160 \times .21$) would be lost by workers who would probably be unable to reach the mall if transit service is not provided.

Employment impacts on inner-city residents are related to impacts on minority workers. The general hiring patterns of the mall's major anchors suggest that 15 percent or 300 of the mall's employees would be minority workers.

The question remains of whether this figure represents a net gain or loss to the minority work force. Here too, any employment loss would probably come from New Haven sales workers because employees in other locations are assumed to travel via auto and could reach the mall.

Current information regarding the racial make-up of New Haven's sales force is not available. 1980 Census data detailing occupational characteristics is still not compiled and other pertinent agencies* depend on the Census for information of this kind. Available data comes from the Connecticut Labor Department, Employment Security Division, which maintains records of the characteristics of job seekers registered with the Connecticut State Job Service.

According to these records, in June 1982 (after Malley's closed), more than 660 sales workers in the New Haven region were looking for jobs, 17 percent of whom were minorities.**

* Agencies contacted: CETA, Employment and Training Administration, New Haven Commission on Equal Opportunities, Greater New Haven Chamber of Commerce, U.S. Bureau of Labor Statistics.

** This data implies that minorities are underrepresented in the sales force. Although they constitute 17 percent of sales force applicants, they accounted for 39 percent of all employed.

Therefore, if no public transit is available, and none of the minority workers have alternative means of transportation, it can be assumed that minority workers would lose 27 (17 percent of 160) retail jobs in New Haven.*

Allowing for the probability that some minority positions would be held by workers who transferred from other locations and that mall stores might hire proportionally fewer minority workers than anchor stores do, the mall would represent a net gain of about 200 new job opportunities for minorities in the New Haven-West Haven SMSA.

Conservation and Development Policies Plan

The Conservation and Development Plan of the State of Connecticut "...provides an advisory policy framework for the planning and investment decisions of State government." (Transmittal letter of October 1982 from Stephen B. Heintz of the State of Connecticut Office of Policy and Management to the Citizens of Connecticut, which accompanied the plan.) Because the proposed mall is privately funded, the policies set forth by the plan do not apply. Nevertheless, the proposed mall complies with the policies as stated in the 1979 to 1982 plan (in effect at the time of draft EIS preparation). Since the publication of the draft EIS, the Connecticut State Office of Policy and Management has released a revised version of the plan (1982 to 1985). This new version contains two changes relating to mall development. Again, while the revised plan is not applicable to the proposed North Haven Mall, the development of the mall would be consistent with its purposes.

The first change was the insertion of a policy statement on the development of large-scale shopping centers:

"Large-scale shopping centers may be desirable in certain Urban Growth or Long Term Urban Potential areas in order to provide unmet shopping and service opportunities accessible to areas of residential growth and which serve to concentrate retail activity which might otherwise be dispersed along highways. New centers should be restrained where population and retail sales growth do not justify them and where the retail market potential is adequately served by existing centers of nearly identical variety and scale of stores which would suffer major economic harm."**

* Transit-dependent inner-city residents and inner-city minority workers are not mutually exclusive populations. Therefore, the numbers representing the impact on these groups are not additive.

** State of Connecticut, "Conservation & Development Policies Plan, 1982-1985," p. 9.

As pointed out in the revised appendix L: Economics and Land Use, the need for retail services within the trade area is demonstrated by the fact that almost \$72 million in the region's consumer dollars in 1977 were spent in nonregional locations. There are clearly no "existing centers of nearly identical variety and scale of stores" within the region. With the 1990 zero-percent real income growth scenario, the New Haven CBD is projected to sustain a sales loss of 9.7 percent, Hamden's Magic Mile, 9.4 percent and the remainder of the SMSA 5.0 percent.

The second change involved a redesignation of the mall's "development" classification. In the 1979 to 1982 plan most of the proposed mall site was designated an Urban Growth Area which, according to the Plan, calls for "High priority and affirmative support towards concentration of new urban growth which occurs outside the Urban Center into specified areas capable of supporting large-scale, mixed uses and densities in close relationship to the Urban Centers."

In the 1982 to 1985 revision, the mall site's designation was altered to Conservation Category on the basis of "updated flood boundary and floodway information prepared by the Federal Emergency Management Agency effective 17 September 1980 which indicated a substantial flood fringe area in the proposed site."* However, flood studies prepared in conjunction with the draft EIS indicate that the mall would meet the five guidelines for State or State-supported "flood fringe development."

These guidelines are:

- a. Adequate civil preparedness (forecasting, notification, evacuation, sheltering) will insure protection of life and continuance of essential services.
- b. Such will not be of a scale or use as would severely disrupt or burden the economy during flood periods.
- c. Such will not necessitate future public expenditures for flood control facilities other than those environmentally acceptable local structures which can be incorporated in the project design or financed through benefit assessments to be identified flood fringe users.

* State of Connecticut Office of Policy and Management letter of 29 March 1982 from Stephen B. Heintz to U.S. Corps of Engineers.

- d. Adequate flood insurance protection can be obtained.
- e. In full compliance with building, excavation and other flood plain and coastal management policies and regulations.

The proposed mall would meet these guidelines because:

- a. The mall would not endanger life, disrupt essential services or measurably increase offsite flooding, and an emergency evacuation plan would ensure adequate forecasting, notification, and other precautions to protect life and property.
- b. The mall would not disrupt or burden the economy during flooding periods because it would not cause perceptible increments in flooding.
- c. The mall would not necessitate future public expenditures for flood control as these features are already incorporated into the proposed project (by means of the detention pond).
- d. Adequate flood insurance protection would be available (thus meeting FEMA guidelines) as the buildings would be raised above the 100-year flood plain.
- e. The site would be in compliance with flood plain management regulations because no fill would be placed beyond the State encroachment lines (as defined in the FEMA Flood Insurance Study for the town of North Haven).*

In addition, FEMA in its review of the draft EIS (letter of 26 March 1982) concluded that the methods used to assess flooding were adequate and agreed with the conclusion that the project would have no impact on flooding.*

* As explained in the augmented appendixes E and F, the conclusions concerning the proposed mall's insignificant impact on flooding are unaffected by the results of the COE study of the June 1982 flood. The mall's satisfaction of the five guidelines of the Conservation and Development Plan for flood fringe development are also unaffected by that study.

Moreover, the Plan itself states "...as statewide mapping and analysis are in a continuing process of change and improvement particularly in the area of environmental resources, detailed information sources which most closely reflect the criteria should be used in site specific analyses and reviews."

Based upon the detailed information obtained and evaluated during the environmental impact statement process, the land use of the site could be appropriately reclassified as an Urban Growth Area, resulting in the proposed mall's conformance with all aspects of the State Plan. In any event, the proposal is consistent with the plan's guidelines for developments in flood fringe areas.

As the preceding discussion indicates, although the State plan is only advisory, and not applicable to private or locally funded projects, the proposed mall is not necessarily inconsistent with its stated policies.

Appendix O: Phase I and Phase 2, Archaeological Investigations

Archaeological investigations revealed three sites eligible for inclusion in the National Register of Historic Places. The sites may represent discrete short-term occupations, and could provide significant information about local and regional prehistoric lifestyles. Development of the proposed mall would probably result in the destruction or alteration of all or portions of the three eligible sites.

The Three Eligible Sites

Site T7-2 lies between the proposed northerly department store and the ring road. The site, approximately 330 square meters, would probably be substantially destroyed by the construction process, which includes the use of heavy equipment and the addition of fill on that portion of the site.

Site T24-1, approximately 1,100 square meters, is located under the proposed parking area between the westerly department store and the buffer zone segregating the development from the Quinnipiac River. This lower level parking lot will require up to three feet of fill to maintain surface drainage. In areas where fill is to be placed, the removal of vegetative cover, including roots, is necessary to prevent buckling and cracking of parking surface. The area must also be compacted prior to placing the approximately 12 inches of subpaving and surface paving. These processes would probably result in substantial impacts on the stratigraphy of the site. The portions of the site that would be filled

are close to the proposed western department store, where construction activities would result in further compaction.

Site MD-1, approximately 5,400 square meters, is situated under the proposed Mall Drive. Approximately one-half of that site would probably be destroyed by the construction of the roadway. Probably the other half of the site would also be partially destroyed, as it may be used for obtaining fill or as the location of the pumping station to facilitate the movement of sewage from the mall to the sewage treatment plant in North Haven.

No Prudent or Feasible Alternative

The locations of the sites preclude feasible or prudent onsite alternatives that would avoid adverse effects. Two of the three sites would be located under proposed parking areas and/or buildings, and could not be reasonably preserved with alternative configurations or designs. The third site would still lie beneath Mall Drive.

If decked parking or a multilevel mall was considered to reduce the area of development, Site T24-1 would still be under a parking area (appendix Q, pp. 29-39). If the proposed mall had only three anchor department stores, Site T24-1 would be underneath the mall buildings (appendix Q, Figure 3).

Site T7-2 would be located under a parking area or the ring road, whether the mall was reduced in size (appendix Q, Figure 3) or alternative site configuration and design options were considered (appendix Q, pp. 29-39).

Site MD-1 is situated under the proposed Mall Drive, the east-west alignment of which is dictated by safety and engineering factors (appendix Q, pp. 35-36).

Archaeological Data Recovery Plan

To avoid or mitigate adverse effects of the proposed mall upon the sites, an archaeological data recovery plan has been agreed upon by the COE, the SHPO, the Advisory Council on Historic Preservation (Advisory Council), and Mall Properties, Inc.

The details of the archaeological data recovery plan would be set forth in a Memorandum of Agreement among the Advisory Council, the COE, the SHPO, and Mall Properties, Inc. The primary objective of the plan is to obtain a representative sample of the material contained within each of the three sites, and to determine the nature of each site (including seasonality, duration of occupation, intrasite variability, and activities) in order to place the sites within the context of Connecticut prehistory in general and to test anthropological hypotheses concerning adaptation in Connecticut inland from the coastal plain.

Excavation would be by natural stratigraphic units, with further subdivisions of 5 centimeter levels if necessary. Specific activity areas or features would be intensively excavated. Excavation would proceed by hand, with water sieving of soil to extract organic material and small lithic items. The representative sampling levels would be 50 percent for Site T7-2, 25 percent for MD-1, and 20 percent for T24-1. The sample percentages are based on the relative importance of each site, intra-site relationships, site size, prior disturbance of each site, and the nature of the soil and cultural deposits at each location.

The material recovered would be processed, categorized, and analyzed, and a report outlining the research design, field methodology, and procedures and analysis would be prepared. Useful archaeological materials would be provided to a suitable repository. Finally, the completed mall would incorporate a public information display of archaeological work in Connecticut in general and at the mall site in particular.

Appendix P: Energy

Truck Traffic During Operations

As described earlier, an estimate of the amount of truck traffic to and from the mall was made (discussion in appendix H and appendix H supplement).

The average trip length for large trucks is 4 to 10 miles per trip.* A conservative assumption was made that 75 trucks would travel 20 miles per round trip to service the mall, for a total truck mileage of 1,500. Assuming an average route speed of 20 miles per hour, each mile of travel for diesel powered trucks would consume 0.045 gallons of fuel.** Such trucks serving the mall would thus burn approximately 70 gallons of fuel (1500×0.045) a day. Nondiesel powered trucks would consume approximately 0.06 gallons of gasoline per mile, thus burning a total of approximately 90 gallons of gasoline a day.

* Herbert S. Levinson "Characteristics of Urban Transportation Demand," Urban Mass Transportation Administration, July 1978.

** Energy and Transportation Systems, Caltrans, December 1978.

Status of Macy's Commitment

Macy's modification of its commitment to the mall has minimal impact on the energy use of the proposed facility. Whether Macy's ultimately participates in the mall, or is replaced by another department anchor store, greater energy consumption than that indicated in appendix P is improbable. Of the four anchor stores, Macy's had one of the highest predicted energy consumption values. This was because the proposed heating system, while 100 percent efficient at the point of use, is only 30 percent efficient when the energy required to produce (through electric generation) and transmit the power is included in the calculation. A different anchor would probably not exceed or be substantially different from the levels estimated for Macy's.+

Moreover, all the stores are required to comply with the "Energy Conservation Standards of the Building Code of the State of Connecticut." This portion of the code is taken from the ASHRAE Standard 90A-1980.

Appendix Q: Alternative Assessment

Alternative Site

Hamden's Evergreen Road Site

As discussed in appendix Q each of the candidate alternative sites for the proposed North Haven Mall was evaluated according to a set of 12 criteria, of which 3 are overriding constraints. These three criteria are:

Access sufficiency. This criterion requires that the candidate site be located so as to have convenient access to an interchange on a limited-access highway, the principal means of access for a shopping center, so that the traffic flow to and from the highway can be channeled effectively into the regional mall.

Compatibility with adjacent land uses. To succeed, a major retailing facility must be located either in an undeveloped area or in an area currently containing commercial or mixed development. Location in a heavily industrialized area would result in substantial environmental and aesthetic disincentives and would jeopardize a new major retailing facility's market success. By contrast, placing a full-scale regional shopping mall in a fully developed residen-

+ All references to Macy's in appendix P should be changed to an unidentified fourth department store.

tial area would produce a range of social and esthetic impacts that might be unacceptable to the neighboring area and would probably render the project infeasible.

Legal or political constraints (status). This criterion requires an assessment of the history of similar development efforts for a given site (if any), the problems encountered, resolutions obtained, and current ownership and legal status. Recent rejection or prevention (for example, because of litigation) of development proposals is considered an "overriding constraint" because development clearly cannot be considered reasonably foreseeable.

At the time appendix Q was prepared the Evergreen site failed to meet all three of these criteria:

Access - The site is located some distance from a major limited-access road. Access to the site would be primarily via Dixwell Avenue, a heavily used and currently congested major arterial road, and via residential roads. (See "Congestion and Air Quality, Carbon Monoxide at Intersections," Regional Planning Agency of South Central Connecticut, April 1980).

Land Use Compatibility - Although zoned appropriately, shopping center activity would be incompatible with the residential subdivisions surrounding this site. The level of activity associated with a regional retail center would be in conflict with the community uses surrounding the site.

Legal and Political Constraints (Status) - In the early 1970's a major department store attempted to locate on the site but was prevented by local opposition. There is no longer any active interest in development of this site as a shopping mall.

Subsequently, the State Court found that the local opposition to the development of the site stemmed from a competitor seeking to suppress competition. Therefore, this site no longer fails to comply with this aspect of the legal and political constraints criterion. However, the site still fails two of the three critical criteria -- access and land use compatibility -- and therefore was not considered a viable alternative to the proposed North Haven site.

Onsite Alternatives

Design Modifications

The withdrawal of the freestanding building and its associated parking, when considered in the evaluation of design modifications such as decked parking facilities, allows for a slight saving of wetlands. There would be substantial cost increases and probable retailing disadvantages associated with those design options. Consideration of their practicability and reasonableness is presented in appendix Q (pp. 30-39).

The decked parking alternative as evaluated in the draft EIS allowed the preservation of approximately 1.9 acres of isolated wetlands in the northeast corner of the site (appendix Q, p. 35). With the withdrawal of the freestanding building and associated parking approximately 1.3 of those acres would not be isolated between that building and the ring-road. The 50 percent increase in site development costs stemming from employing decked parking for 25 percent of the necessary parking spaces and the substantial retailing detriments of such structures, are unaffected by the withdrawal (appendix Q, pp. 31-33).

The saving of 3.7 acres that could theoretically be achieved by constructing a three-level mall (appendix Q, pp. 38-39) would not be enhanced significantly by withdrawal of the freestanding building. The location of the northern portal and ring road cannot be modified because of safety and engineering constraints (see section following on portal design); only therefore approximately 2.4 acres of wetlands in the northeast corner could theoretically be preserved. Of that area, 1.3 acres of wetlands are already preserved by withdrawal of the freestanding building, and some additional area is needed for parking. A saving of only 0.9 acre of additional wetlands in the northeast corner could thus be achieved by constructing a multilevel mall. The only other wetlands that could reasonably be preserved by this option are those along Valley Service Road to the south of the drainage ditch, and those would be isolated and of extremely limited value (appendix Q, p. 50).

The increased construction costs and undesirable physical layout associated with a multilevel mall are unchanged (appendix Q, p. 39). In particular, a multilevel (three-story) mall would increase costs because of the need for additional vertical transportation (escalators) and the cost of designing and constructing parking levels that would facilitate customer access to all store levels. The cost of two escalators for the mall would range between \$.5 and \$.6 million; for each anchor store the cost would be approximately \$250,000 to \$300,000.

Additional fill would be necessary to elevate portions of the parking lots to the level of the third story of the mall and anchor stores, so that some customer flow would occur. The elevation of approximately 1/3 of the parking lots would necessitate an additional 350,000 cubic yards of fill which, at a cost of \$5 per cubic yard, would

increase construction costs by approximately \$1.75 million. This would represent an almost 15 percent increase in site development costs.

The additional fill would have to come from offsite, and would nearly double the impacts projected for the transportation of offsite fill. Extra fill would also cause an additional loss of flood storage.

See following table for a comparison of onsite alternative configurations.

Reduced Facilities

Withdrawal of Free-Standing Building

The wetlands saving that could be achieved by a three-anchor mall in these circumstances is limited to 1.3 acres of primarily wooded swamp, in the northeast corner (not already preserved by the withdrawal of the freestanding building). This minimal saving is due to the infeasibility of relocating the northerly entrance portal and ring road. The impracticabilities of increased costs, diminished revenues, retail disadvantages, and curtailment of public benefits of the three-anchor mall remain unchanged (appendix Q, pp. 39-51).

Revised Public Need and Retail Support

Analysis of retail consumer capacity using available 1980 census data indicates that there is a greater need for retail facilities to serve metropolitan New Haven than the draft EIS indicated. The draft EIS used estimates of per capita income prepared by the Census Bureau during intercensal years. However, the 1980 Census data revealed that these estimates underestimated actual income and hence the purchasing power of the region's residents. (Despite substantial fluctuations in the national and regional economies throughout most of the 1970's, real per capita income in metropolitan New Haven grew at an average annual rate of 0.7 percent between 1969 and 1979, with the suburban fringes accounting for virtually all of the increase.) This underestimation of income offsets a previous overestimation of the region's population, used in the draft EIS and appendix L to determine regional purchasing power. As a result, the amount of consumer dollars leaving the region, both now and in the future, is greater than that originally presented in the draft EIS.

The increased need for additional retailing reflected by the 1980 census data is reinforced by a report prepared for the city of New Haven. The 1980 data show a need for substantial additional department store space in metropolitan New Haven (See Review of the Phillips/Norwalk Report, January 1983 at pp. 31-33).

TABLE 3. SUMMARY COMPARISON OF ONSITE ALTERNATIVE CONFIGURATIONS

Alternative	Proposed Configuration	Decked Parking (25%)	Multi-Level Mall Structures	Reduced Scale (3-Anchor Store Mall)	Suggested CFE Configuration*	Suggested CFE Configuration with Necessary Minimal Modifications**
Total developed acres	76 ⁺	66 ⁺	72 ⁺	64 ⁺	49 ⁺	52 ⁺
Acres of mall footprint	15	15	11	11	10.5	10.5
Acres of parking	39	29	39	31	20	20
Acres of wetlands eliminated	24	22 ⁺⁺	24	19	18	20
Impacts on wetlands preserved	-	The requirements of the on-site road network would cause the physical isolation of 2 acres of wetlands that could be preserved. This isolation would severely limit the value of the wetlands for wildlife habitat, vegetative diversity, and water storage and purification.	-	The requirements of the onsite road network would cause the physical isolation of the 5 acres of wetlands that could be preserved. This isolation would severely limit the value of the wetlands for wildlife habitat, vegetative diversity, and water storage and purification.	The DOT channel, which provides surface water to the wetlands in the middle of the site (approximately 5 acres), would be eliminated causing the ultimate demise of these wetlands.	Same as suggested CFE configuration. In addition, the requirements of the onsite road network would cause the physical isolation of approximately 2/3 of an acre of wetland, effectively destroying its value.
Impacts on flooding	No measurable impact on flooding in the Quinnipiac River is expected. Stormwater discharge to the river would be reduced for large storms.	The 2 acres of wetlands preserved constitute only 3% of available site storage for the 100-year flood. Since no flooding impacts would occur with the proposed layout, this saving would not affect flooding.	Same as proposed configuration.	The 5 acres of wetlands preserved constitute only 7% of the available site storage for the 100-year flood. Since no flooding impacts would occur with the proposed layout, this saving would not affect flooding.	Essentially same as proposed configuration.	Essentially same as proposed configuration.
Impacts on traffic	The mall would generate 42,000 weekday trips daily and 56,000 trips on Saturday. All roads would maintain acceptable levels of service.	Same as proposed configuration.	Same as proposed configuration.	The reduced scale mall would generate 33,000 weekday trips daily and 44,000 trips on Saturday. All roads would maintain acceptable levels of service.	Traffic generation is essentially the same as the reduced scale mall. The onsite circulation and design of the entrance portals would cause traffic congestion and unsafe conditions. Locating Mall Drive far from the northern entrance portal also creates a hazardous condition.	Traffic generation is essentially the same as with the CFE alternative. Modification adds a circumference ring road, but onsite circulation remains poor and unsafe. The northern entrance portal remains as proposed for safety purposes.
Impacts on air and noise quality	No significant impact.	Same as proposed configuration.	Same as proposed configuration.	Air and noise impacts would be less than with the proposed configuration.	Similar to reduced scale mall, except that the traffic congestion that would be caused by the poor onsite circulation and portal design would cause some increase in air and noise pollution.	Similar to the reduced scale mall, except that poor onsite circulation would cause some minimal increase in air and noise pollution.
Would regional retail need be satisfied?	Yes.	Decked parking would significantly increase the applicant's site development costs, which in turn would likely affect project feasibility. Decked parking may reduce shopper use of those mall stores dependent upon it.	This configuration would substantially increase construction costs and create a physical layout undesirable to mall patrons.	This configuration would reduce the mall's ability to improve the region's retail sales "capture" rate. Suburban fringes of the metropolitan areas would remain unsatisfied from a retail standpoint. There would be a reduction in potential employment and income benefits. The reduced size would affect the economic viability of the Mall.	Less than with the reduced scale mall, because this configuration encompasses economic and retailing disincentives of the decked parking, multilevel mall and reduced scale mall alternatives. Configuration would exceed cost of proposed mall, with substantially decreased revenues, jeopardizing project's economic feasibility. Layout offers poor retailing configuration and no comparable customer access to different levels and portions of the mall and anchor stores.	Similar to the suggested CFE alternative (without modification) except that the provision of slightly improved onsite circulation would provide inadequate, but somewhat better, customer access to all three anchor stores.

* CFE, Connecticut Fund for the Environment, 19 April 1982.

** Necessary Minimum Modifications are ring road and movement of northerly entrance portal to location opposite Mall Drive.

⁺ The total developed acres depend on actual detailed design. The numbers presented are considered reasonable estimates of area requirements in accordance with design standards and site constraints. All figures represent withdrawal of free-standing building from mall proposal.

⁺⁺21 acres if 50% of the parking is decked.

TABLE 4
SMSA Purchasing Power and Sales
Outflows (in Millions 1977 of Dollars)

	1977	1990 0% Income Growth	1990 1% Income Growth
<u>Purchasing Power</u>			
Revised Appendix L*	\$354.7	\$363.5	\$419.4
DEIS**	\$346.2	\$360.6	\$410.4
<u>Outflow</u>			
Revised Appendix L*	\$ 71.7	\$ 76.0	\$ 86.5
DEIS**	\$ 66.4	\$ 70.4	\$ 80.2

The need for a modern mall in the region is indicated by the interest of department stores in the proposed North Haven Mall. Four department stores have announced their intent to participate in the mall. Although corporate commitments to allocate immediate resources to ongoing expansion in Florida and Texas and delays in the government approval processes have caused Macy's to defer priority funding for the mall, the store reaffirmed its continuing interest in participation. Another department store, Sage-Allen (a large Connecticut-based organization), has pursued participation in the mall for the past several years. Sage-Allen's interest in participation in the mall has intensified over the last months.

Reduction of Capacity to Serve Public Need

Restricting the proposed mall to three anchor stores would reduce its capacity to provide sufficient additional retail services for satisfying public need (appendix Q, pp. 42-45). The 1980 Census data revealed that the need for a modern retailing center in the New Haven metropolitan area has increased; reduction of the mall to three anchor stores would diminish its capacity to meet and compete for this economic demand.

For example, conservatively assuming that a 25 percent reduction in retail space would result in a proportional decline of \$21 million in revenues, sales transfers would decrease from \$23.8 million to \$17.9 million, and 1990 leakage recapture would decrease from \$44.6 million to \$33.5 million assuming 0 percent real income growth (updated appendix L). The provision of retail services to the north and east suburban fringes, those areas most in need of additional retail facilities, would be the most heavily affected by such a reduction.

* Source: Income 1980 Census; Office of Policy and Management (OPM) population projections, Fall 1982.

** Source: Estimated Income from P-25 series, Bureau of Census; Office of Policy and Management population projections, February, 1982.

Analysis of Alternative Suggested by

Connecticut Fund for the Environment

The Connecticut Fund for the Environment (CFE) has proposed alternative three-anchor-store mall. The CFE design proposed a three-story mall, decked parking, and placement of the reduced mall on the southerly two-thirds of the site (a site plan of the proposal is figure 10 in the final EIS). Analysis shows that the suggested alternative violates basic precepts of engineering and safety design, contravenes elementary retailing and marketing principles, is economically impracticable, and could not achieve the claimed saving of wetlands because (a) the lack of circulation system to facilitate access to the entire mall, would create hazardous conditions for vehicles and pedestrians; (b) the limited circulation system does not allow access of emergency vehicles to portions of the buildings; (c) the northern entrance portals are improperly designed to handle the anticipated volume of traffic, and would cause traffic congestion and consequent safety hazards; (d) the left and then right turn necessary for vehicles entering the mall from Mall Drive create a hazardous condition; (e) the southerly relocation of Mall Drive suggested by CFE is barred by safety and engineering factors; (f) the circulation plan and building locations do not provide for comparable consumer flow to all sections of the mall, placing the westerly stores at a particular retailing disadvantage; (g) the northerly mall area is not "anchored" by a department store; (h) there would be a disproportionate decrease in revenues the CFE plan's failure to take into account fundamental retailing concepts; (i) the cost would exceed that of a four-anchor-store mall, particularly because of the need for parking decks; and (j) the most minimum modifications, designed to reduce the plan's hazardous conditions, would allow the preservation of 3.7 additional acres of wetlands. Thus, CFE's suggested reduced mall alternative is less practicable than the conceptual three-anchor-store mall evaluated in appendix Q and in the draft EIS.

Onsite Traffic and Safety Engineering

Problem elements with the CFE mall proposal include its treatment of traffic access and circulation, largely because of the attempt to reduce the land used for the proposed project. The CFE proposal does not have a defined onsite traffic circulation system as there is no roadway along the northerly end of the building arrangement. The absence of full circulation around the mall contradicts accepted design standards and would be hazardous. There would, for example, be no access for fire equipment or safety and emergency vehicles to reach the northern end of the buildings.*

* Unless the decks and ramps are constructed unusually high, in excess of 10 feet, trucks have virtually no access to the buildings. Such access was assumed to be intended, and allowed for in the design of the parking structures and ramps. As explained subsequently, the increased height would necessitate additional construction costs.

The North Haven Mall proposed ring road is designed to serve as an internal distributor of traffic, linking site access roads from Valley Service Road to the individual parking areas, truck service courts, and other onsite destinations without conflict with pedestrian flow between the parking areas and store entrances. The Urban Land Institute* states that "[i]n a regional center, parking area circulation requires a belt roadway around the edge of the site and another around the building itself. The inner belt allows for fire and emergency access and also for delivery and customer drop-off and pick-up." The Institute further states "...trafficways through a site impede the flow of pedestrians, complicate customer car movement within the parking area, and contradict the basic principal of unity in the shopping facility."

In addition to the absence of the ring road in the CFE mall proposal, onsite circulation appears restricted and potentially hazardous. Most of vehicles entering the site would circulate under the parking decks, and thus would be subjected to poor visibility and tight turns by the presence of structural elements. Vehicles parked in the northwesterly portion of the CFE-proposed mall site would be forced to enter and exit the parking area at a single point, adjacent to the southerly department store, creating substantial amounts of traffic near the store entry.

Regional shopping center design examples presented in the Institute of Transportation Engineers (ITE) publication "Guidelines for Planning and Designing Access Systems for Shopping Centers" illustrates methods used to discourage traffic from the inner roadway to avoid vehicle-pedestrian conflict. These include grade change islands and curbed "fingers" which direct traffic to the outer ring road. The CFE site plan appears to effect the opposite by its southern and middle-northern access portals directing traffic to an inner road next to the mall and two of the three anchor stores.

Portal Design Considerations

The location of Mall Drive and the northerly portals, as contained in the proposed CFE site plan, would be contrary to accepted engineering safety practices. A left turn from Mall Drive followed by an almost immediate right turn on a high volume access portal road would be potentially hazardous condition. In addition, these turning movements would significantly lower the carrying capacity of Mall Drive, thereby reducing accessibility for nearly half of the expected visitors. This could result in greater use of the Route 22/Valley Service Road entrance, the only alternative access opportunity.

* Shopping Center Development Handbook, Urban Land Institute, Washington, D.C. 1977.

In the CFE proposal the northern portals are not designed to handle high volume traffic, but approximately 45 percent of traffic would enter there. The absence of an adequate roadway at these northerly portals for queuing of vehicles exiting the mall would create traffic congestion, with increased hazard to drivers and pedestrians.

The CFE proposal suggests that Mall Drive can be curved to permit a more southerly intersection with Valley Service Road; such a conversion, however, would present engineering and safety problems. The two roadways, which constitute a high-volume intersection, should be perpendicular or near-perpendicular to provide appropriate vehicular sight distance. To bring Mall Drive south to the location suggested by CFE, an acute reverse curve between the Amtrak underpass and the intersection with Valley Service Road would be necessary. Such an acute curve would not allow sufficient sight distance.

The reverse bend created by curving Mall Drive to achieve a more southerly intersection with Valley Service Road would result in a radius of only 200 feet. Such an acute curve would have a design speed of only 25 miles per hour (mph), substantially below the town of North Haven's standard of 50 mph. The town has accepted a design speed of 40 mph where physical restrictions have not enabled satisfaction of its standard for major high-volume access roads. Even with this reduced speed, the State of Connecticut Department of Transportation maximum curvature is 8 degrees, corresponding to a radius of 716 feet, which is more than the 650 feet available for placing a curve between the railroad and Valley Service Road. Using the maximum superelevation permissible would reduce the curvature to 11 degrees or a radius of 521 feet, but the two curves required could not fit in the available area.

Another problem is that reverse curves encourage lane encroachment, curve cutting, and cause visibility restrictions, creating unnecessary hazardous conditions.

The location of Mall Drive is restricted by the necessary design objective of dividing traffic between the two access roads (Mall Drive and Valley Service Road) north and south along the site and the physical constraints of the area. To achieve the split in traffic, the northerly access road must align with the mall site somewhere along the northern half. A more southerly intersection would create traffic congestion and conflict with vehicles entering the Valley Service Road from Route 22.

The physical constraints to locating Mall Drive are consistent with the design objective in that there is no location further south of the proposed alignment capable of accessing Valley Service Road. South of the I-91 interchange, the existing development of Washington Avenue, combined with the embankment of I-91, effectively precludes an access road. To the north of I-91/Washington Avenue interchange, the only possible location for Mall Drive further south of the proposed alignment is occupied by the Ramada Inn. Thus, the proposed location of Mall Drive is as far south as is physically possible.

The exact location of Mall Drive on the available property is dictated by the topography of the area, the geometry of the Amtrak tracks, and the location of high-voltage electric lines and associated towers. Minor changes in alignment would require relocation of one of the towers and significantly increase the cost of the requisite railroad bridge to the town of North Haven. Therefore, the Mall Drive alignment proposed by Mall Properties, Inc., represents the lowest cost location meeting the design objectives while maintaining the greatest degree of driver safety.

The CFE comment suggests that the increase in hazardous traffic conditions would be diminished by a significant reduction in traffic. The ITE Trip Generation Handbook, a standard reference based on surveys throughout the Nation, indicates that malls with less than one million square feet of gross leasable area have higher traffic generation than larger malls. As shown in appendix Q, table 3 a three-anchor-store mall of 840,000 square feet (a reduction of 25%) would generate 33,000 weekday trips, approximately 45 percent of which would enter through Mall Drive and the northerly portals. This high volume of traffic, using the access and circulation patterns suggested by CFE and reviewed above, could increase hazards for auto users.

Retailing Considerations

The traffic circulation patterns are not generally compatible with accepted marketing concepts. The major portion of the parking proposed in the CFE plan is located on the easterly and southerly portions of the proposed site plan, with a smaller amount of the total parking requirement situated in the westerly portion. This disparity in parking facilities does not provide comparable customer access to the three major anchor stores, which is a basic retailing precept. The plan also lacks comparable customer access to all three levels of the CFE proposed mall, which is an important retailing principle.

In addition, the proposed circulation plan is not conducive to parking near the westerly store. The westerly department store would be poorly located with respect to pedestrian flow. Consequently, such an arrangement would be unattractive to users.

The CFE proposal does not provide for direct parking in the mall area north of the easterly and westerly department stores. Moreover, the proposal does not include an anchor department store in that area, which would make leasing of space there unattractive and difficult. These design failures are not even partially offset by a circulation pattern designed to encourage parking in this area of the proposed mall.

Limited Wetland Mitigation

The CFE site plan was designed principally to avoid directly affecting the approximately 8 acres of wooded swamp wetlands on the northern portion of the site, of which approximately 6.7 acres would be

filled by the proposed project. However, because the northerly portal should be opposite Mall Drive for engineering and safety reasons, and that road cannot be shifted to the south, a substantial portion of this saving cannot be practicably realized.*

The required movement of the northerly portal to be opposite Mall Drive and the addition of a minimum ring road around the site, without much-needed engineering and retail improvements, would necessitate the elimination of approximately 2 acres of wetlands, and another two-thirds of an acre of wetlands would be totally isolated between the ring road, parking, and mall buildings. Because the CFE plan would require filling approximately 0.4 of an acre, a total of just over three acres of wetlands would be eliminated by the suggested alternative. The CFE plan, with the minimal necessary modification, would thus save approximately 3.7 acres of wetlands more than the Mall Properties, Inc., proposal.

Decrease in Revenues

The mall proposed by CFE would be is less competitive than that proposed by Mall Properties, Inc.; it would generate less revenues and cost more to construct.

The reduction in competitiveness would result partly from constructing approximately 35 percent of the requisite parking be in decks. Decked parking is costly and usually not considered competitive in a new suburban mall (appendix Q, pp. 32-33). The design of vehicular flow, decked parking, pedestrian flow, consumer flow, and store locations would probably make the CFE mall less competitive than the conceptual three-anchor-store mall analyzed in the draft EIS.** Thus, the reduction in revenues would probably exceed the minimum 25 percent reduction predicted for the conceptual three-anchor-store mall evaluated in appendix Q.

* The northerly movement of that portal would also facilitate the directing of vehicles to the rear parking, a necessary circulation improvement.

** The discussion of the retailing disadvantages associated with the conceptual three-anchor-store mall in appendix Q would also generally apply to the proposed CFE alternative.

Increase in Costs

The decrease in revenues and reduction of marketing and competitive status would probably not be offset by savings in construction costs. The construction costs of the CFE conceived mall, would exceed those of the three-anchor-store mall analyzed in the draft EIS (appendix Q, p. 47), and would also exceed the cost of the proposed four-anchor-store mall.

The site-filling requirements for Mall Properties, Inc.'s proposal differs little from the CFE alternative because the latter occupies the lower (in elevation) portion of the site, which would require almost complete filling. The alternative would probably result in a saving of fill over approximately 30 percent of the 78 acres at an average depth of approximately 10 feet. The alternative, however, would require the filling of approximately 30 acres in the southeast (not required in the applicant's proposal) at roughly the same average depth. Thus, the filling and grading costs would be roughly the same, as would the utility costs.

Because the CFE proposes a smaller (by approximately 29 percent) pad and mall building shell a saving roughly proportional to the reduction in size, of approximately \$2.1 million would result. A number of additional expenses may offset that savings. For example, the preparation of the pad would be more expensive because of the higher foundation loads for the three-story buildings. The more detailed exterior design work of the CFE proposal would entail extra construction costs. The pedestrian ramp and vehicle ramp between the two southerly parking decks would be added expenses.*

Construction of decked parking for approximately 35 percent of the spaces required by the smaller CFE mall would incur added costs of approximately \$8.2 million. This figure is derived by multiplying the number of parking spaces allocated to parking decks (35 percent of 4,200 or 1,470) by the \$5,600 cost differential between decked parking (\$7,000 per space) and on-grade parking (\$1,400 per space). While the cost of decked parking generally ranges between \$4,000 and \$8,000 per space (appendix Q, p. 31), the \$7,000 figure is appropriate because CFE's suggested parking decks and/or ramps must be of sufficient height to allow for the passage of trucks and/or fire engines (delivery trucks could reach the westerly stores only by going through or under the parking deck or ramps; because the northerly deck would be adjacent to the mall, a raised deck would be needed for fire engine access).

* Adding a ring road and moving the northern portal opposite Mall Drive would require increased fill, and further augment the cost of the CFE alternative.

Excluding the additional costs noted above onsite construction costs for the CFE alternative would exceed those of the proposed four-anchor-store mall by \$6.1 million. This would increase the developer's overall construction costs for the proposed four-anchor-store mall by approximately 13 percent to 14.5 percent.

The higher cost associated with the CFE proposal is confirmed by the estimate accompanying the CFE proposal. The CFE cost estimate of \$35 million to \$40 million excludes the costs of filling, grading, pad preparation, and the detention pond. These activities comprise approximately \$10 million of the \$12 million site development costs (appendix Q, p. 32). Assuming the accuracy of the estimate provided by CFE, the addition of these site development costs would increase the range of the CFE three-anchor-store alternative to a range of \$45 million to \$50 million, compared to the range of \$42 million to \$47 million for the Mall Properties, Inc., proposed four-anchor-store mall.

Summary of CFE Proposal

The greater cost, lower productivity, and probably unfavorable competitive position of the CFE proposed mall compared to the Mall Properties, Inc. proposal reduces the practicability of this proposal for economic reasons. However, limited savings in wetlands can be effected. Modifications to the CFE roadway design proposal would be needed to insure safe auto and pedestrian movements.*

Alternative Uses of the Site

In addition to the alternative site uses discussed in appendix Q, the alternative for light industrial development of the site suggested in several comments on the draft EIS was also analyzed.

The comments suggested that light industrial development would be a better use for the mall site because development would generate equivalent tax revenues but result in less flooding, less traffic, less pollution, fewer changes in the quality of life, and more skilled, high-paying jobs. A specific scenario (Stop the Mall/CCAG, 27 March 1982; FEIS, volume 2; and volume 3, PO-7), proposed 22 industrial sites on the property, as an example to illustrate these contentions. The industrial development proposal is considered below.

An economic and market analysis found little demand for light industrial use of the site. Also there was little likelihood that even if light industrial use of the site were practical that its development would be undertaken. Forecasts of regional economic activity indicate that the

* Table 3 of appendix Q is modified by the following table to include the CFE suggested alternative, (also table 4, FEIS).

region would require only about 280 acres of industrial and office land over the next 20 years (appendix Q, pp. 52-56). Some of this demand would be met through reuse of existing structures. The remaining demand could be met by available land located throughout the region. North Haven alone has over 200 vacant but developable acres in its industrial parks. Thus, there is not enough market demand to absorb additional large scale property like the mall site (117 acres).

Extensive investment in infrastructure, both onsite and offsite would be needed, but was not taken into account by the suggested comment in the financial analysis or the feasibility assessment of the industrial alternative. Use of at least a major portion of the site would be required to offset this investment. Two industrial parks are now under construction in North Haven and a third, the Defco Industrial Park has vacant parcels; therefore sufficient demand for industrial sites, to attract a developer to make a largesite infrastructure investment, is doubtful. The following discussion compares industrial development at the proposed site with mall development, regardless of the marketplace demand for industrial development.

Land Use and Employment

According to the comment on the draft EIS, the 22 structures would cover about 33 acres, compared to the proposed mall's 76 acres,* and would generate a total of 2,200 to 4,400 jobs, greater than the 1,600 full and part-time jobs projected for the mall. The scenario, as presented, does not account for zoning requirements, access, parking, landscaping, and other ancillary facilities. In addition, considering the distribution of the site's wetlands (draft EIS, figure 17), such development could not occur on the site without eliminating some wetlands, at least the shrub swamp at the center of the site.

With these additional requirements, generation of the high estimate 4,400 jobs on 22 sites would appear to need considerably more land than 33 acres. According to the Institute of Transportation Engineers' Trip Generation Handbook, industrial parks house approximately 1.9 employees in every 1,000 gross square feet of building area. To generate 4,400 jobs, therefore, a total building area of 2,316,000 square feet would be necessary. The preferred building layout for light industrial use in suburban locations is a single-story structure, which facilitates internal goods movement, and allows for high ceilings (if necessary) at the lowest cost. If this type of structure is built, the 53 acres of buildings would be necessary to house 4,400 jobs.

* The comment preceded the withdrawal of the freestanding building, and saving of 2.1 acres. The analysis in this section has conservatively assumed that 78 acres, rather than the actual 76, would be developed by the mall.

Parking areas, as well as buildings, consume considerable land. The comment postulates that 4,400 cars would be accommodated onsite. The town zoning ordinance requires a minimum of 270 square feet of parking area per car, including aisles, but excluding circulation roadways around the parking areas. For the number of cars expected, this translates to 1,188,000 square feet or 27.3 acres in addition to the gross floor area. The comment excluded the necessary internal roads, landscaping and parking lot circulation roads. A typical industrial park provides approximately 20 percent of each site for circulation roads and landscaping; at the proposed mall site, this would total 700,800 square feet or 16 acres. The entry road and subdivision roads are estimated to consume an additional 5 acres. Therefore, this scenario would use a total of 101.3 acres. The lot coverage would not be 30 percent as the comment suggests, but closer to 75 percent of the total of 117.5 acres including buildings, roads, and parking. This figure compares to a lot coverage of 66 percent proposed by the mall.

With this level of coverage, the site would require a similar stormwater facility to that proposed for the mall (that is, a 16-acre detention pond). Thus, the total area required to house and serve a light industrial park of the size suggested in the comment could be about 117 acres. However, some compromise in design (possibly of flood control) would be necessary to fit the industrial development on the site, which has available only some 98 acres landward of the stream encroachment lines.

No saving of either ponds or wetlands would be likely with this scenario because the site coverage appears to be greater than the proposed mall.

The actual amount of light industrial use the mall site can accommodate remains to be determined. If a coverage the same as for the proposed mall is assumed, 78 acres for development plus a 16-acre detention pond, a somewhat smaller industrial park would result. The access roads leading to the 22 individual sites would cover about 5 acres, leaving 73 acres for sites. Because 20 percent of each site would be required for onsite circulation and landscaping, 58.4 acres would remain for development. Assuming the same employment and parking space requirements, results in a total employment of approximately 3,200, as compared to 4,400.

If site use is limited to the 33 acres presented in the comment, employment would be much lower. Of the 33 acres to be developed, three would be required for access roads, leaving 30 acres for the sites. Buildings and parking would use 80 percent (24 acres) of this. This translates into employment of approximately 1,300 people -- 300 fewer than the mall's estimated 1,600 jobs.

For this level of development a detention pond nearly as large as necessary for the denser use would be required. To be effective, the pond

must mitigate stormwater peak discharges from both the site and its upstream drainage area, a total of approximately 900 acres. The amount of paved acreage resulting from this 33-acre development would be 45 acres less than that of the proposed mall with 78 acres of paved area. This is five percent of the total drainage area and would affect its peak discharge only slightly. Thus, a pond of about 15 acres would still be required.

The impacts from these three scenarios for light industrial parks follow.

1. Tax

Assuming a full replacement value basis to determine assessments and construction costs of between \$20 to \$25 per square foot (Means Cost Estimating Guide for Mixed Industrial and Warehouse Use), the assessed values of the three scenarios presented would be as follows:

<u>Scenario</u>	<u>Assessed Value Range*</u>
(1) 22 sites - 4,400 employees	\$27.8 to 34.7 million
(2) 22 sites - 3,200 employees	\$20.2 to 25.2 million
(3) 33 acres developed - 1,300 employees	\$ 8.2 to 10.3 million

Taxes accruing to the town by this development (using the comment's assumed mill rate of 46.30) would be:

<u>Scenario</u>	<u>Annual Property Tax Revenue</u>
1	\$1.3 to 1.6 million
2	\$0.9 to 1.2 million
3	\$0.4 to 0.5 million

(These analyses exclude personal property to be consistent with the analysis appearing in revised appendix L. However, the mall would probably generate equal or greater personal property taxes than a light industrial development.)

Thus, to achieve tax revenues comparable to those of the mall development, the site would have to be developed more extensively than the proposed mall, potentially resulting in equal or greater impacts on the environment (primarily, flooding, wildlife, and vegetation, including wetlands).

* Based on 60 percent of full value and a mill rate of 46.3 as presented in the comment. It is recognized that Connecticut now uses a 70 percent assessed value ratio.

2. Flooding

Scenario 1, onsite with tax rateables equivalent to those of the mall, requires the detention basin would have to be eliminated. This means that a full 101 acres (80 percent of which would be paved) would be developed. Peak flows from this site with no detention basin would be increased and, therefore, flooding potential would be worse for this development than the mall.

Scenario 2 would duplicate the mall's impacts on flooding, because it would require the same amount of filling and generate only slightly lower onsite flows.

Scenario 3 would allow less filling and an opportunity to provide a detention basin. This alternative would generate less onsite runoff, but compared to the entire drainage through the site, the reduction would not be significant.

Because the analysis of the loss of river valley storage at the mall site demonstrated no impact on river flooding and the mall site is not in the conveyance way of the Quinnipiac River, the reductions in possible flood impacts achieved by scenario 3 are not measurable.

3. Traffic

For all three scenarios, daily traffic generated by the light industrial use, would be less than that generated by the mall. However, during the peak hour (i.e., that time when increases in traffic have the greatest impact) the differences between uses would be diminished. Proposed mall traffic would be spread out over the day; a mall facility would open after the weekday morning peak and its peak activity period would not coincide with the evening rush hour. Temporal distribution of the traffic generated by industrial use, however, shows high peaks in the morning and evening.

The number of daily auto trips and peak trips would be as follows:

<u>Scenario</u>	<u>No. of Vehicle Trips (Weekday)</u>	<u>No. of Vehicle Trips (Saturday)</u>	<u>Evening Peak Hour (4-5 p.m.)</u>
Mall*	42,000	56,000	3,760
(1)	14,080	--	2,860
(2)	10,240	--	2,080
(3)	4,160	--	840

Light industrial development of this site would have to minimize infrastructure costs to be feasible. These costs could be reduced only by eliminating Mall Drive. Without this additional access road, all traffic generated would be forced to use Route 22 and Valley Service Road. This would concentrate the peak-hour traffic on fewer roads than the mall generated traffic would use to the site. For example, traffic exiting from I-91 Southbound would have to travel along Washington Avenue to Route 22 for access to the site while northbound I-91 traffic would either use the same route as southbound exiters or would have to travel down Clintonville Road to I-91.

4. Pollution

Because all three scenarios for industrial park development would generate less traffic, lower transportation related air and stormwater quality impacts would result. Sanitary sewage flows would be comparable to those for the mall and scenario 1; scenarios 2 and 3 would generate less sewage.

However, the comment did not consider the pollutants possibly generated by the industrial operations. The mall would generate no industrial wastes but light industry might include metal finishing, which discharges heavy metals. Discharges of this type might result in an increase in pollutants discharged to the river. Light industry may also include stationary sources of air pollution not present in mall use.

5. Quality of Life

In general, discussions of impact on quality of life are subjective. However, some bases for comparison can be established. The mall and scenarios 1 and 2 would transform the site from vacant, industrially zoned land to an active suburban use. Scenario 3 would create a similar, but diminished, change. The effect of commercial use (the mall) as opposed to industrial use on a community's quality of life is difficult to assess and is usually expressed in terms of a number of specific impacts as follows.

* As discussed in the supplementary information for appendix H, withdrawal of the freestanding building would generate 1.5 percent less traffic.

If one compares fiscal "likes" (whereby, an industrial use, scenario 1, would have the same tax benefits as the mall), industrial use would produce:

- 1) Equal or greater site coverage, which could increase flooding potential.
- 2) Greater visual impacts because of diminished buffer zone.
- 3) Slightly lower traffic impacts during the evening peak, much greater impacts during the morning peak, and much lower impacts on weekend traffic.
- 4) Transportation-related air and stormwater quality impacts that parallel traffic impact (in both cases no standards would be exceeded).
- 5) The potential for operations-related air and water quality impacts.
- 6) Increase in North Haven's employment base of up to 2,800 more than the mall.

Comparing alternatives with similar site coverage (that is, scenario 2 and the mall) the industrial use would produce:

- 1) Similar impacts on the natural and visual environment.
- 2) Fewer traffic and transportation-related air quality impacts (except during the morning peak when the mall would not be open).
- 3) Possible for operations-related air and water quality impacts.
- 4) About 80 percent of the tax revenues that the mall would generate.
- 5) An employment increase of up to 1,600 more than the mall.

Comparing the minimum impact scenario to the mall, the industrial use would produce:

- 1) Reduced impacts on the natural environment, except that flood control would be similar.
- 2) Greatly reduced traffic and related impacts, except during the morning peak.
- 3) Some potential for operations-related air and water quality impacts.

- 4) About 35 percent of the tax revenues.
- 5) Less employment than the mall.

The comparison indicates differences between the mall and each of the three alternative scenarios for industrial development. In considering the impact of any scenario on the quality of life in North Haven, several subjective issues are relevant: the importance of the site itself, how the town's tax revenues contribute to the quality of life, the town's ability to support the current quality of life, sensitivity to traffic on major arteries, and what the eventual industrial mix and its effect on air and water quality might be.

6. Employment

Light industrial use of the site would not result in more skilled, highly paid permanent jobs than the mall. Scenario 1 with its 4,400 jobs could not be accommodated practically on the site. Scenario 2 with 3,200 jobs would result in the same site-related impacts as the mall. Scenario 3, using only 33 acres to minimize site impacts, creates approximately 1,300 jobs, fewer but similar to the mall, as predicted in the revised appendix L.

Jobs created by light industrial use of the site would be derived in several ways. Some would be transferred jobs from other locations, or generated in response to economic growth where they are accommodated on the proposed North Haven mall site, or created by new business operations entering the region. Some of these jobs would be new additions while others are not. Similarly, some of the mall jobs would also be transferred from other locations or would result from economic growth. The mall, however, would generate retail sales which would not occur in its absence thereby adding several hundred jobs to the regional workforce (after allowing for some sales and employment losses elsewhere in the SMSA).

The industrial jobs would include a broad array of occupations including, at the high end, professional and managerial personnel, and at the low end clerical and service personnel. These jobs would not necessarily be higher paying than the positions associated with the mall. The mix would depend on the type of industrial employers that would locate in a light industrial park at the proposed mall site. Once open, the mall would reach full employment within 3 years, with a major portion of employment achieved upon opening; for the light industrial alternative, employment would result only as site parcels were developed and occupied. Considering the current availability of vacant industrial sites in North Haven, full occupancy of another industrial park at the mall site would not occur for many years and, therefore, benefits would not accrue to the town until well into the future.

Appendix S: U.S. Fish and Wildlife Services Report

See attached Coordination Letter of November 10, 1981.



UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
P.O. Box 1518
Concord, New Hampshire 03301

Mr. William Lawless, Chief
Regulatory Branch
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02254

NOV 10 1981

Dear Mr. Lawless:

We have completed our review of Public Notice 13-79-561, dated December 17, 1979. Mall Properties, Inc. has requested a permit to place fill material in conjunction with shopping mall construction in backwaters and adjacent wetlands of the Quinnipiac River in North Haven, Connecticut.

This is the report of the Fish and Wildlife Service, submitted in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), to aid you in the evaluation of this application.

This final report is submitted to fulfill our responsibilities under the Fish and Wildlife Coordination Act to advise you on possible damage to fish and wildlife resources from this project, and to recommend measures to prevent, mitigate, or compensate for these damages. We have previously submitted to you (April 30, 1981) our habitat analysis of the project, based on the 1976 version of the Habitat Evaluation Procedures (HEP). The habitat analysis, together with the FWS Mitigation Policy, the 404(b)(1) guidelines, and the Technical Memoranda titled "Vegetation, Wildlife, and Wetlands," and "Alternatives Assessment," form the basis for this report.

Construction of a shopping mall will eliminate 46 acres of habitat evaluated in the habitat analysis - 21 acres of upland habitats and 25 acres of wetland habitats. In addition, 26 acres of habitat classified as disturbed, and 6 acres of habitat classified as open water will also be eliminated, for a total loss of 78 acres. The 32 acres of disturbed and open water areas were not evaluated during the habitat analysis, as they are the result of recent sand and gravel mining activity at the site, and their habitat value was judged to be low, although some wildlife utilization undoubtedly occurs.

Review of the 404(b)(1) guidelines, Subpart D, section 230.32 and Subpart E, section 230.41, indicates significant impacts will occur on biological characteristics of the aquatic ecosystem. These impacts will result from the destruction of wetland vegetation and the elimination of biological productivity. The conversion of wetland and upland portions of the site to a mall will result in the loss of breeding and nesting areas, escape cover, travel corridors, and food sources for resident and transient wildlife species such as those evaluated in the habitat analysis. Development of the site will have

RED. Impact Assessment Branch

secondary impacts in that all species of wildlife now utilizing the area will be forced to relocate to other areas, most likely to undeveloped areas to the north and west of the site, to compete for suitable habitats with wildlife already existing at those sites. Secondary development generated by the mall will increase development pressure on undeveloped areas adjacent to the site, resulting in further reductions of wildlife habitat.

Subpart B, section 230.10(a) of the 404(b)(1) guidelines requires a showing that practicable alternatives to the discharge of fill material in a special aquatic site are not available, before the discharge can be certified as being in compliance with this section. Although it is not our job to determine the practicability of alternatives, we do feel that several alternative sites discussed in the "Alternatives Assessment," i.e. the Connecticut Post Mall expansion and the Marsh Hill Road site, would cause significantly less adverse impacts on the aquatic ecosystem than the proposed site.

The FWS Mitigation Policy provides for the classification of habitat into one of four categories, based on value of the habitat for evaluation species. Utilizing the results of our habitat analysis, we would classify the upland forest, successional shrub/old field, and wooded swamp habitats in Resource Category Three, as having high to medium value for evaluation species such as white-tailed deer, gray squirrel, raccoon, wood thrush, eastern box turtle, American kestrel, indigo bunting, wood duck, red-tailed hawk, and wood frog. The shrub swamp and marsh habitats would be classified as Resource Category Four, having medium to low value for species such as the muskrat, red-winged blackbird, spring peeper, great blue heron, and northern water snake.

Subpart H of the 404(b)(1) guidelines discusses actions to minimize adverse effects. The FWS Mitigation Policy and our habitat analysis report provides a basis on which to recommend measures to mitigate adverse impacts of land and water developments on fish and wildlife resources and their habitats. The habitat analysis report discusses the procedures and calculations used to determine the value of the existing habitat and what amount of habitat and management is necessary to replace habitat unit losses. The Mitigation Policy discusses the mitigation goal for each resource category, and what recommendations the Service makes to accomplish these goals. For the habitats to be impacted in Resource Category Three, i.e., upland forest, successional shrub/old field, and wooded swamp, the mitigation goal is no net loss of habitat value while minimizing loss of in-kind habitat value. This means that if habitat losses cannot be avoided or minimized, those losses should be compensated for by replacement of habitat value, either with habitat of the same kind (in-kind) or of a different kind. For Resource Category Four habitats, i.e. shrub swamp and marsh, the mitigation goal is to minimize loss of habitat value.

Mitigation includes several types of actions, considered in descending order or priority. One type of action is to avoid the impact. This can be accomplished by designing the project to avoid damage or loss of fish and wildlife resources, use of a nonstructural alternative to the project, or not constructing the project. In this context, the only viable means of avoiding the impact is to not construct the project. If the impact cannot be avoided, a second type of mitigation is to minimize the impact. This can be accomplished by locating the project at the least environmentally damaging site, reducing the size of the project, and controlling water pollution through best management practices. As stated earlier, less environmentally damaging alternate sites may be available, and their practicability should be determined. Of the 119-acre mall site, 78 acres will be eliminated by the buildings and parking areas. An additional 16 acres will be utilized by the proposed detention pond, designed to collect and filter runoff from the site before it enters the Quinnipiac River. Thus, 23 of the 117 acres will remain undeveloped. A third type of mitigation is to rectify the impact. Seeding, fertilizing, planting trees and shrubs are some examples of rectifying impacts. At the mall site, a 75 to 100-foot buffer strip of undisturbed vegetation will be left between the river and the development. Trees and shrubs will be planted between the development and the river along the southern edge of the site, where gravel mining has eliminated vegetation. A final type of mitigation is to compensate for impacts. This can be done by conducting habitat construction activities to restore or rehabilitate previously altered habitat or modify existing habitat, or to conduct wildlife management activities to increase habitat values of existing areas. In both cases, project lands and nearby public lands would receive priority for these types of activities.

To determine an overall mitigation plan for this development, we have considered these four types of mitigation. As discussed above, the only possible means of avoiding the impact is to not construct the project. The purpose of the habitat analysis and this report is to advise you in one aspect of the public interest review, i.e., fish and wildlife values; as you consider other aspects of the public interest in reaching a decision. To minimize impacts, we recommend you determine the practicability of alternate sites not requiring discharge of fill material in special aquatic sites, as specified in section 230.10(a) of the 404(b)(1) guidelines. The water pollution and flood storage aspects are to be mitigated by the 16-acre detention pond. The development has been sized so as not to occupy the entire 117 acres of the property. Sedimentation and erosion control measures should be applied throughout the construction period. Other than these, we have no further recommendations to minimize the impact. To rectify the impact, the Applicant has proposed leaving a buffer strip next to the river and plantings of trees and shrubs. They have also proposed providing fish access to the detention pond.

If the development is constructed at this site, the proposed measures to minimize and rectify impacts will not mitigate for the loss of habitat value of Resource Category Three habitats, i.e., wooded swamp, upland forest, and successional shrub/old field. Because of the recognized value of wetlands, and their increasing scarcity as opposed, in general, to upland habitats, we would recommend that priority consideration be given to fully compensate for the loss of 8 acres of wooded swamp habitat. This could be accomplished by conducting wildlife management activities to increase habitat value on the project site or nearby lands, or to conduct habitat construction activities on previously altered habitat. On the project site, management activities such as water control structures, clearcutting, nesting platforms, coniferous plantings, dugout ponds, and food plantings could be conducted to increase habitat value. However, for several reasons, we do not believe much of this can be done on site. One reason is that only 23 acres of undeveloped habitat will remain after project construction. Sixteen of these 23 acres is wooded swamp, which already has a medium to high habitat value, and little or no increase could be accomplished. The other 7 acres is upland, and some increase in habitat value could be accomplished, but not nearly enough to compensate for the loss of 8 acres of wooded swamp.

Thus, the only viable means of compensating for the loss of wooded swamp would be to investigate adjacent or nearby areas that could be managed to increase habitat value. Priority should be given to investigating areas nearest the site, then working outward, generally keeping within the Town of North Haven and/or nearby areas within the Quinnipiac River basin. Management techniques of most value would be the creating of wetland habitat in a degraded or previously altered area, or increasing the productivity of existing wetlands by controlling water levels, eliminating undesirable vegetation, creating open water area, etc. As a guide to the size of the mitigation area required, the habitat analysis determined that 31 acres of habitat would have to be managed to increase its productivity to a moderate to high level. An area of less than 31 acres but with higher management potential would also meet the mitigation goal.

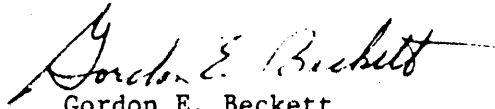
To summarize, the Fish and Wildlife Service recommends that:

1. You determine the practicability of alternate sites not requiring the placement of fill material in special aquatic sites, as prescribed in section 230.10(a) of the 404(b)(1) guidelines.
2. If you determine that no practicable alternatives involving less environmental damage than the proposed plan are available, that wetland habitat losses in Resource Category Three, i.e., wooded swamp, be fully mitigated as discussed above, and as prescribed in section 230.10(d) of the 404(b)(1) guidelines.

3. If wetland losses are not adequately mitigated as discussed in recommendation 2, we would most likely appeal your decision to issue a permit because of the significant adverse effects on biological characteristics of the aquatic ecosystem, as prescribed in section 230.10(c) of the 404(b)(1) guidelines.

Please advise us of your determination on these matters or if additional technical assistance is desired.

Sincerely yours,

A handwritten signature in cursive script, reading "Gordon E. Beckett". The signature is written in dark ink and is positioned above the printed name and title.

Gordon E. Beckett
Supervisor